GAS

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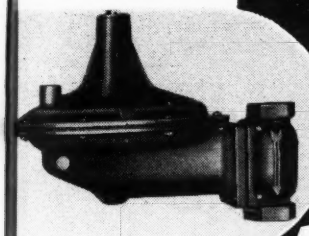
OCT 11 1947

Reynolds PRESENTS

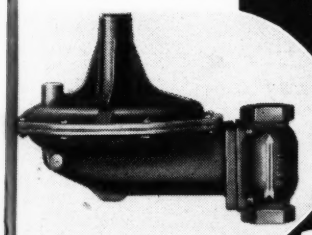
NEW PROVEN SERVICE REGULATORS

with FOUR INSTALLATION POSITIONS FOR CONNECTIONS

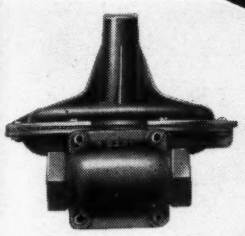
with TWO INSTALLATION POSITIONS FOR SPRING TOP EITHER POINTING UPWARD OR DOWNWARD



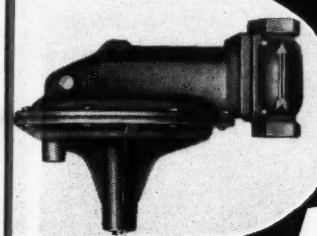
Normal Vertical Position with Down Flow



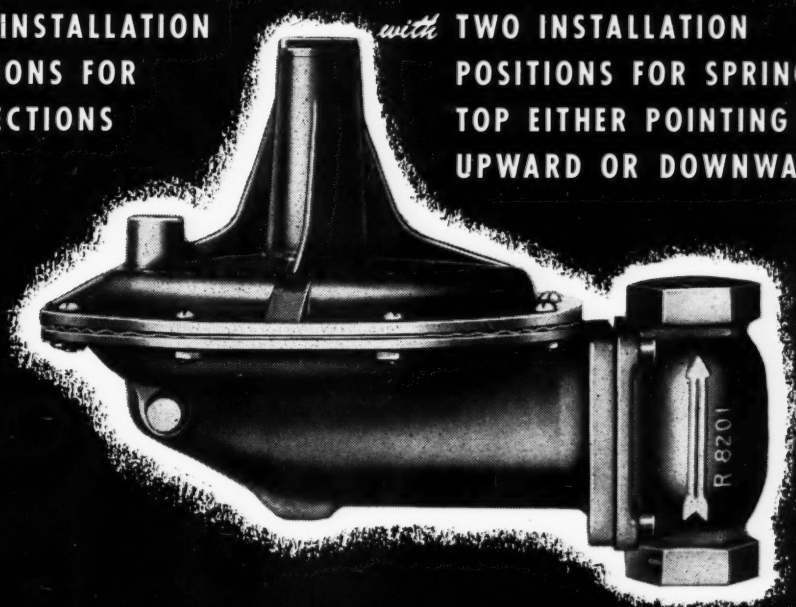
Normal Vertical Position with Up Flow



Normal Horizontal Position, Flow may be either direction.



Vertical Position for Water Drainage



Regardless of whether the installation calls for a vertical position with either upward or downward flow or a horizontal position with flow in either direction, the new Reynolds offers this unusual installation.

With the spring top in an inverted position, the problem of moisture is solved as water will automatically drain out of the atmospheric chamber.

1. This regulator is available with any type seal previously made by Reynolds.
2. Quickly installed in existing house piping.
3. May be installed in any position on a 90° setting.
4. Orifice can be changed at any time.
5. To inspect orifice or valve pocket, only an Allen wrench is needed.

REYNOLDS GAS REGULATOR CO.

ANDERSON, INDIANA, U. S. A.

Reliance Filters

FOR HOME AND INDUSTRIAL USE

TYPE 'A' FILTER

This filter is used extensively with individual appliances such as water heaters, ranges, furnaces, etc., and is recommended for general use on house service lines in dust areas of the distribution system. Three sizes of elements for this type of filter are available, each with a different filtering area. Made with ¾" connection only.

TYPE 'B' FILTER

This type of filter is recommended for general use on the house service lines in dust areas of the distribution system. It is made with ¾" or 1" standard pipe connections and has a gasket type union at one end. Replacement of filter elements, when necessary, can be made on the job. Installation of this filter may be made in a horizontal or vertical position.

TYPE 'C' FILTER

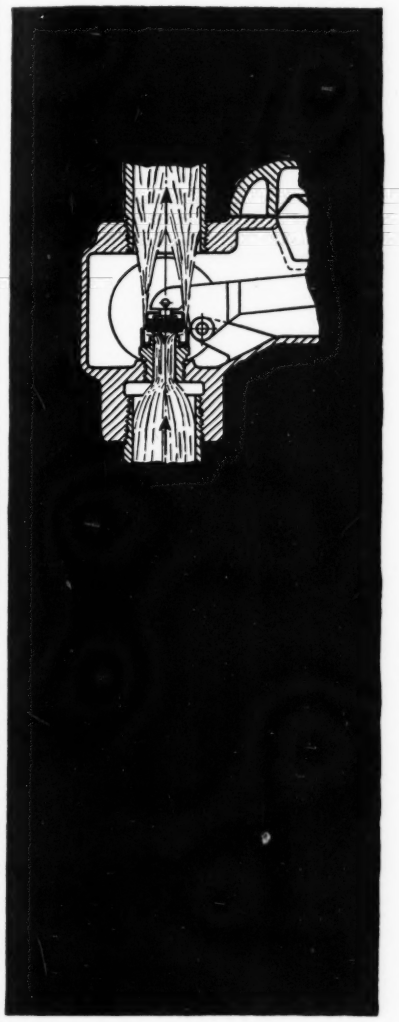
This type of filter is recommended for use on distribution and industrial services where larger volumes occur. The screwed type connections and the Series 15 flanged connections are suggested for working pressures up to 150 p.s.i. The Series 30 flanged units may be used normally for working pressures up to 300 p.s.i.

Reliance Folder No. 35 gives complete specifications. We will be glad to mail a copy on request.

AMERICAN METERS

RELIANCE REGULATORS

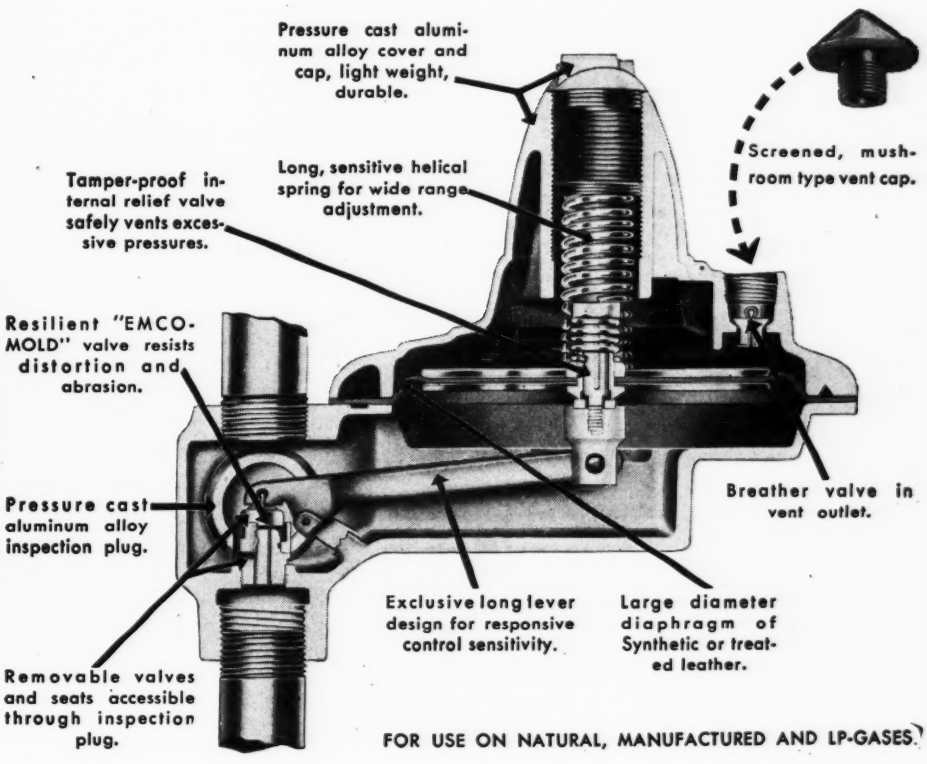
Cushion THE IMPACT OF PEAK LOADS *with* ROCKWELL • EMCO *Ejector* SERVICE REGULATORS



★ No longer is it necessary to carry excessive wasteful pressures in distribution systems in order to anticipate sudden increased loads. Just install Rockwell-Emco ejector regulators on all service outlets. These modern controls will then automatically boost utilization pressure in direct proportion to the demand. And they do it without the use of trouble provoking auxiliary springs, levers or toggle mechanisms.

There are other advantages, too, that you will welcome. These include increased capacity over previous designs, minimum build-up at no load, and assured safety through the use of a tamper-proof internal relief valve.

Now's the time to prepare for those winter loads by modernizing your system with Rockwell-Emco ejector service regulators. Bulletin No. 1126 will be sent on request, but better still ask the nearest district office for an actual demonstration.


Pressure cast aluminum alloy cover and cap, light weight, durable.
Screened, mushroom type vent cap.
Long, sensitive helical spring for wide range adjustment.
Tamper-proof internal relief valve safely vents excessive pressures.
Resilient "EMCO-MOLD" valve resists distortion and abrasion.
Pressure cast aluminum alloy inspection plug.
Breather valve in vent outlet.
Exclusive long lever design for responsive control sensitivity.
Large diameter diaphragm of Synthetic or treated leather.
Removable valves and seats accessible through inspection plug.

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Highlights

TIME GROWING SHORT IN BIG INCH APPLICATION. Next month final payment by Texas Eastern Transmission Corp. to the WAA for the lines will be due. The company is growing anxious over financing of the lines; quick action is imperative if the company's timetable on building up capacity to 433 MMcf is to be followed. Oral arguments began Sept. 25 and an early decision by the FPC which would clear the way for filing of the plan with FPC was fervently hoped for. (See Page 64.)

SEVEN MILLION GAS RANGES. That's how many the industry will sell in the next three years, says the AGA. Source of the information was a survey among utilities launched by the association early this year. Three and a quarter million automatic gas water heaters, half a million manually-operated water heaters, 1,875,000 gas house heating units, and 1,464,000 refrigerators will also be sold, utilities answering the questionnaire predicted.

MERCHANDISING EXPENSES DIVORCED FROM RATE MAKING. The New York Public Service Commission, while granting a temporary rate increase to Brooklyn Union Gas Co., Kings County Lighting Co., and Brooklyn Borough Gas Co., ordered that appliance merchandising expenses be excluded from operating expenses chargeable to rates.

A COMBINATION HOT WATER HEATER AND AIR CONDITIONER IS IN THE WORKS. Hotpoint, Inc., is developing a new device, using Freon gas, which absorbs heat in the atmosphere, exchanges it to the water tank, and thus cools the air in the home. Test models are now being installed. At present, company engineers admit, the equipment is too bulky, noisy and expensive (from the standpoint of first cost) to be marketable. (See Page 27.)

MORE IRONS IN THE FIRE FOR PG&E. On the heels of California Utilities Commission approval of the plan whereby the Northern California utility will receive, by displacement, Texas gas from Southern California and Southern Counties Gas Co's. came the announcement that El Paso Gas Co. had filed application with the FPC for $55 million construction including looping of the southern line plus a 470-mile line to be built expressly for Pacific Gas & Electric. Also under consideration is a line from the New Church Buttes field in Wyoming—if present exploration bears out predictions of a deep wet gas structure. (See Page 27.)

NATIONWIDE TRANSMISSION PROJECTS UNDER WAY TOTAL $273 MILLION. Between July 1, 1946, and June 30, 1947, the FPC approved applications for additions to pipe line systems which will benefit 80 major cities and many smaller communities in 20 states, and will move an estimated additional 1,861,000,000 ft. of gas per day. This information was given last month by the commission.

ADEQUATE GAS FOR DETROIT NEXT WINTER "ASSURED." The court battle waged by the FPC against Panhandle Eastern Pipe Line Co. and Michigan Consolidated Gas Co. to prevent sales to certain large industries in the Detroit area terminated in an agreement which, according to Consolidated's President Henry Fink, "puts Detroit in the best position of any city in the Middle West." In effect, the agreement will build up a 1 billion-cu.-ft. reserve in storage fields of the Michigan Gas Storage Co. (See Page 68.)

GAS HAS GOT IT CAMPAIGN SWINGS INTO ACTION. Opening shot was fired Sept. 22 in "Life" in the form of a full-page ad featuring Magic Chef. Five more ads in national consumer magazines will appear this month. GAS this month salutes the campaign with a 7-page story giving all the details which make this the greatest coordinated promotion program in history. (See Page 33.)

ANOTHER GAS LINE FOR THE EAST COAST? Transcontinental Pipe Line Co. is planning to build a $155 million, 1800-mile natural gas pipe line to carry gas from Hidalgo county, Texas, to New York city. The line would measure 26 in. and would be designed to carry 400 MMcf per day. Transcontinental's president is Claude Williams of Austin, Texas.

From gas field to gas user . . . all piping equipment from CRANE

Anywhere from gas well to gas burner . . . Crane is the name you're most likely to see on piping equipment. And for good reason: There's no better, more dependable quality than Crane. Nor sounder practice than to standardize on the complete Crane line.

Shown here is a typical example of how Crane meets gas piping needs. Reach for the Crane Catalog and everything for the job is at your finger tips. It's your key to simplified piping procedures . . . from design to erection to maintenance. Because it gives you this 3-way advantage on every piping installation:

ONE SOURCE OF SUPPLY offering the world's largest selection of steel, iron, brass and alloy piping materials for all power, process, and general service applications.

ONE RESPONSIBILITY for piping materials—helping you to get the best installation, and to avoid needless delays on the job.

OUTSTANDING QUALITY in every item—assuring uniform dependability and durability throughout piping systems.

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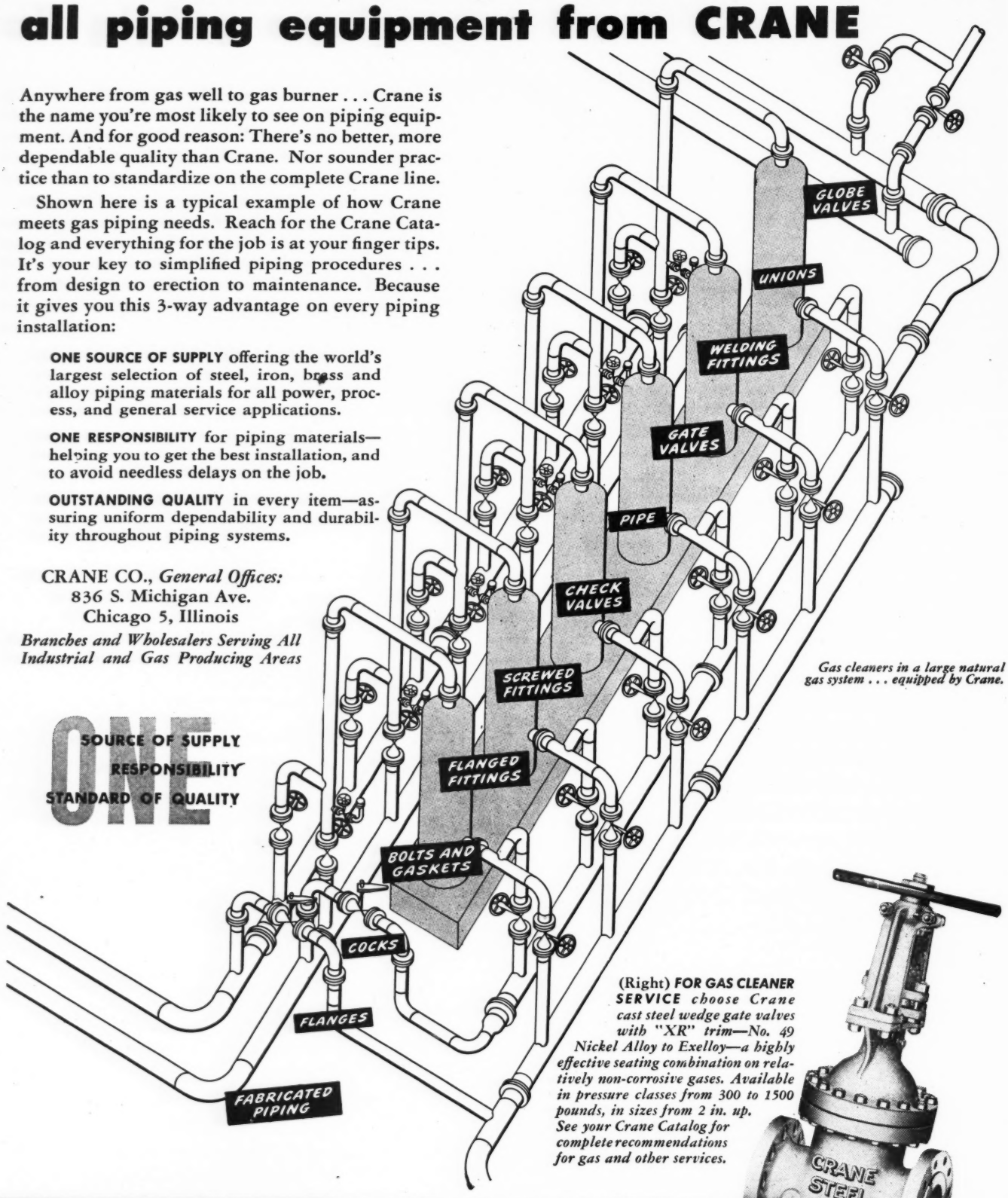
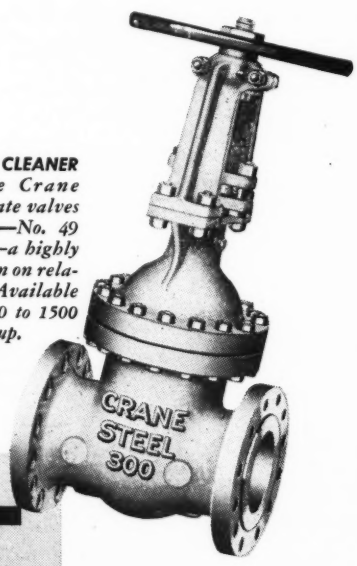


Gas cleaners in a large natural gas system . . . equipped by Crane.



(Right) **FOR GAS CLEANER SERVICE** *choose Crane cast steel wedge gate valves with "XR" trim—No. 49 Nickel Alloy to Exelloy—a highly effective seating combination on relatively non-corrosive gases. Available in pressure classes from 300 to 1500 pounds, in sizes from 2 in. up. See your Crane Catalog for complete recommendations for gas and other services.*

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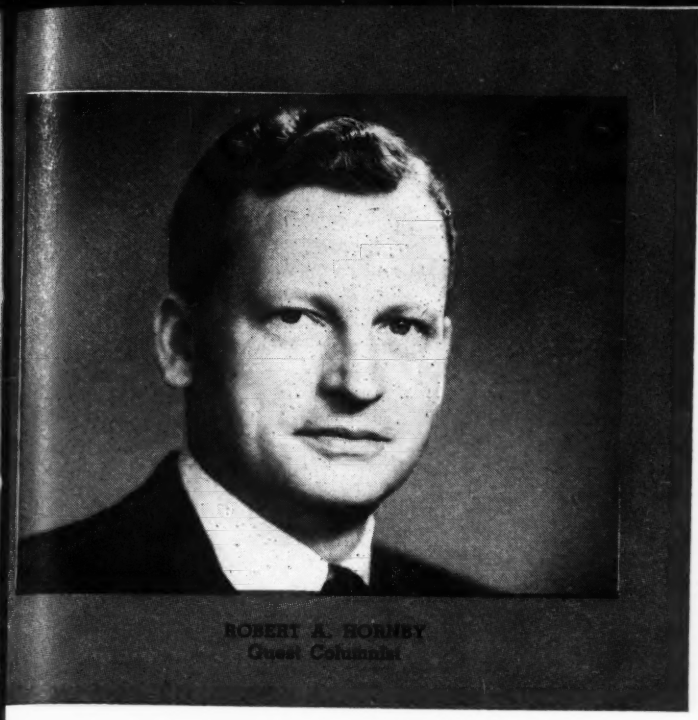
PIPE • PLUMBING
AND HEATING

CRANE

FOR EVERY PIPING SYSTEM



ROBERT A. HORNBY
Guest Columnist

Now We're All Heading In the Same Direction

By ROBERT A. HORNBY

Incoming Chairman, A.G.A. Special Committee on Promotion, Advertising and Research

THE "Gas Has Got It" Promotional Campaign of the American Gas Association, which is so effectively presented in this issue of GAS, has a significance beyond its immediate objective of stimulating the sales of automatic gas ranges. The words "cooperation" and "coordination" have been too freely used and too infrequently realized. However, in the case of the promotion, advertising, and research program out of which the "Gas Has Got It" campaign arises, there is genuine meaning being put into the words "cooperation" and "coordination" in a manner which I believe has never been accomplished by a whole industry. The various units of the gas industry are truly headed in the same direction and within an unprecedentedly short time have not only agreed on what they wish to accomplish, but are actually under way. In addition to this inspiring unanimity of purpose and effectiveness the whole program has the additional merit of being economical. Hence there can be little question as to whether it will be successful.

This campaign is no one-time burst of energy. It is a continuing program based on the complete reorganization of the national promotional, advertising and research activities of the industry under the banner of the American Gas Association. The utility companies have subscribed about $1.5 million each year for the past three years for research, advertising and promotion on a national scale. This program has been renewed for three years and the new plan calls for the expenditure of approximately $4.8 million in the next three years, an increase of about $600,000 over the initial program.

As a result of recommendations of a special reviewing committee, all promotional activities of the association such as national advertising, special promotional work, residential and commercial section activities, and publicity, which hitherto operated under the jurisdiction of separate committees, are in process of being completely integrated under a General Promotional Planning Committee. This latter group will have the enlarged responsibility for the general planning and integration of all these activities with each other and also with those of gas companies and manufacturers.

Thus a basic premise is that *every step* in the selling process is interrelated and should be treated as such in the association's activities, as well as those of its member companies. This means that consumer advertising—point-of-sale material—and all other promotional activities will be planned as a whole, and built around the same basic ideas. Hence the promotional program of the gas industry and all of its units will be headed in the same direction and more work will result from each dollar spent.

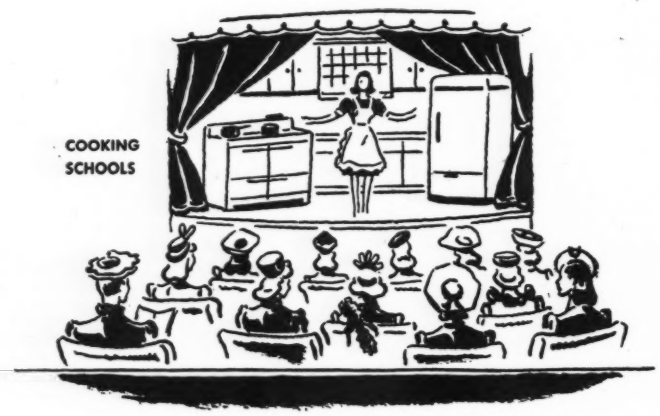
It is the view of the companies with which I am connected that this cooperative effort provides them with not only the most effective but also the most economical means of providing mass promotion, national advertising, and extensive research. We are well aware of the amount of promotional material we are using which has been prepared by the AGA Promotional Committee. We have long recognized the large number of advertising messages which come into our territory from the AGA campaigns, and we also know that through the association we are conducting diversified research which we, separately, could not afford even on a much reduced scale.

This demonstration of what the industry can do when it concentrates wholeheartedly on a single objective is an inspiration to management, employees, and investors. The comments of those who are willing to invest their money in this industry agree that it is evident the gas business is headed for the top position in searching out that which is new and better. However, these are gains collateral to the main objective.

The "Gas Has Got It" campaign is aimed at our customers, and it will be consistently hammered home to them that gas is best, whether it be for cooking, water heating, house heating, air conditioning, refrigeration, or other uses. This national coordinated promotional drive is employing mass "shock" tactics with which to influence public thinking on an unprecedented scale. The change-of-pace advertising technique is new to our industry, and embraces appliance manufacturers' participation to a greater degree than ever before. By special arrangement, actual models of automatic gas ranges and brand names of ranges of participating manufacturers will appear in the national gas advertisements of the association for the first time. This means a closer tie-up with this branch of our industry and greater promotional effort by the manufacturers. This combination of utility, manufacturer, and dealer, is sales effort of a solidarity and breadth which will be felt by the American public. It is an effort requiring our best support and direction. And I think you will agree that the program "Has Got It."

CLEAN GAS

Is Essential in Today's Gas Promotion Program



COOKING SCHOOLS

NEWSPAPER ADS

LEAFLETS

WINDOW DISPLAYS

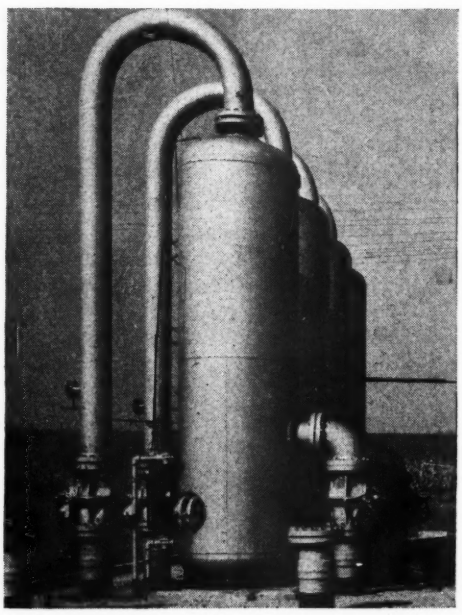
Consumer leaflets and advertising, motion pictures and cooking schools, are the icing on the cake in today's industry-wide gas promotion plans. Beneath this icing must be appliances with the most modern features, and a supply of uniformly high quality gas fuel.

Dust-laden gas, enemy of gas man and consumer alike, has no place in the modern scheme. Clean the gas, and consumer complaints are few.

Blaw-Knox Gas Cleaners deliver conditioned gas that measures up to the promises of modern gas promotion programs.

★ ★ ★

Blaw-Knox Gas Cleaners are offered in sizes up to 72 inches diameter working at 800 lbs gage pressure and beyond. Smaller "K" Type Gas Cleaners are available to protect district regulator stations, individual industrial installations and similar applications.



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Blaw-Knox designs, manufactures and erects—Compressor Stations—Propane-Air Stations—Absorption and Stripping Plants for removal of Naphthalene, Gums, Tar, and Light Oils from manufactured gas.

Ask for Catalog No. 1869

BLAW-KNOX
GAS CLEANERS

THERMALLY THINKING

More - - And Still More

THE Big Inch, the FPC report on construction of natural gas transmission facilities (the commission authorized $273 million worth of expansion in 12 months), completion of the Colorado Interstate line to Denver and other big developments to the contrary notwithstanding, the fuel situation in California continues to be just about the biggest story of the month—month in, month out.

While the entire Northeast and Midwest are clamoring for a cut of Big Inch gas, which, the FPC willing, will not in the foreseeable future exceed 433 MMcf—and that figure won't be reached for a year—California is talking in terms of 500 million and up. The Biggest Inch is now almost a reality, and will soon be pouring into the state 305 million a day; last month, El Paso Natural Gas Co., builders of this line, applied for FPC permission to loop that line for an extra 100 million—for northern California —and to build a second line to serve the northern distributor, Pacific Gas & Electric Co., up to 100 million more. That's 5 million over half a billion right there; but that's not all.

Hardly was the news off the wire when it was reported that PG&E was considering still another source—Church Buttes field, near Granger, Wyo. How much gas could be expected from that source remained problematical—but Mountain Fuel Supply Co., developer, apparently thought plenty. The company reportedly had already sunk $1 million into the field to get the answer.

Church Buttes was first tapped in 1946. The discovery well was brought in at 12,000 ft. and tested more than 34 MMcf of wet gas potential daily; this is now about 40 MMcf at 7200 psi. Four more wells have gone down; already No. 2 has shown promise.

The state has grown so tremendously and is assuming —through determination—such stature that it will need all this gas. Then, too, its own gas reserves, bled doubly by the vampire of war, are fast reaching a nadir. It can make good use of—shall we say three quarters of a billion?

It's a pretty good bet that it will get it, too. End use and all the other arguments which beset Eastern applicants are non-existent in the Southwest. There is, really, no opposition.

Heat Pump Again

ELECTRICITY is making another bid for the water heater load, but this one's going to be a long time coming.

From here it looks like a new application of the "heat pump," which created quite a stir just about a year ago, but which has not been heard from much since.

As a method of heating water, this new device doesn't sound as if it would be much to worry about, competitively speaking. But insofar as it may do a little air conditioning on the side, it should be enough to make the gas industry sit up and take notice.

It has been developed by Hotpoint and, according to reports, works this way:

Freon gas is contained in a series of coils, which connect to a compressor. The latter compresses the gas, causing its temperature to increase, and it is carried to coils inside the water tank. Here it condenses and heats the water. Thence back to the evaporator, where it resumes its gaseous state as it returns to room temperature. At this point it cools the atmosphere, drawing heat from the surrounding air.

The device is thermostatically controlled; that is, when the temperature of the water reaches 150° F, the compressor shuts down.

The advantage of the apparatus lies in its operating economy. Hotpoint believes it should quarter electric water heating bills. In such case, of course, the air conditioning feature would come free.

The disadvantages are numerous—at this point. Original cost is reported to be $300 or so. The heaters are not at present equipped with a time switch to prevent their operating during peak load hours. Add to the first cost the expense involved in distributing the cold air throughout the house. Then there's the problem of controlling the amount of cooling produced as against hot water requirements. Etc.

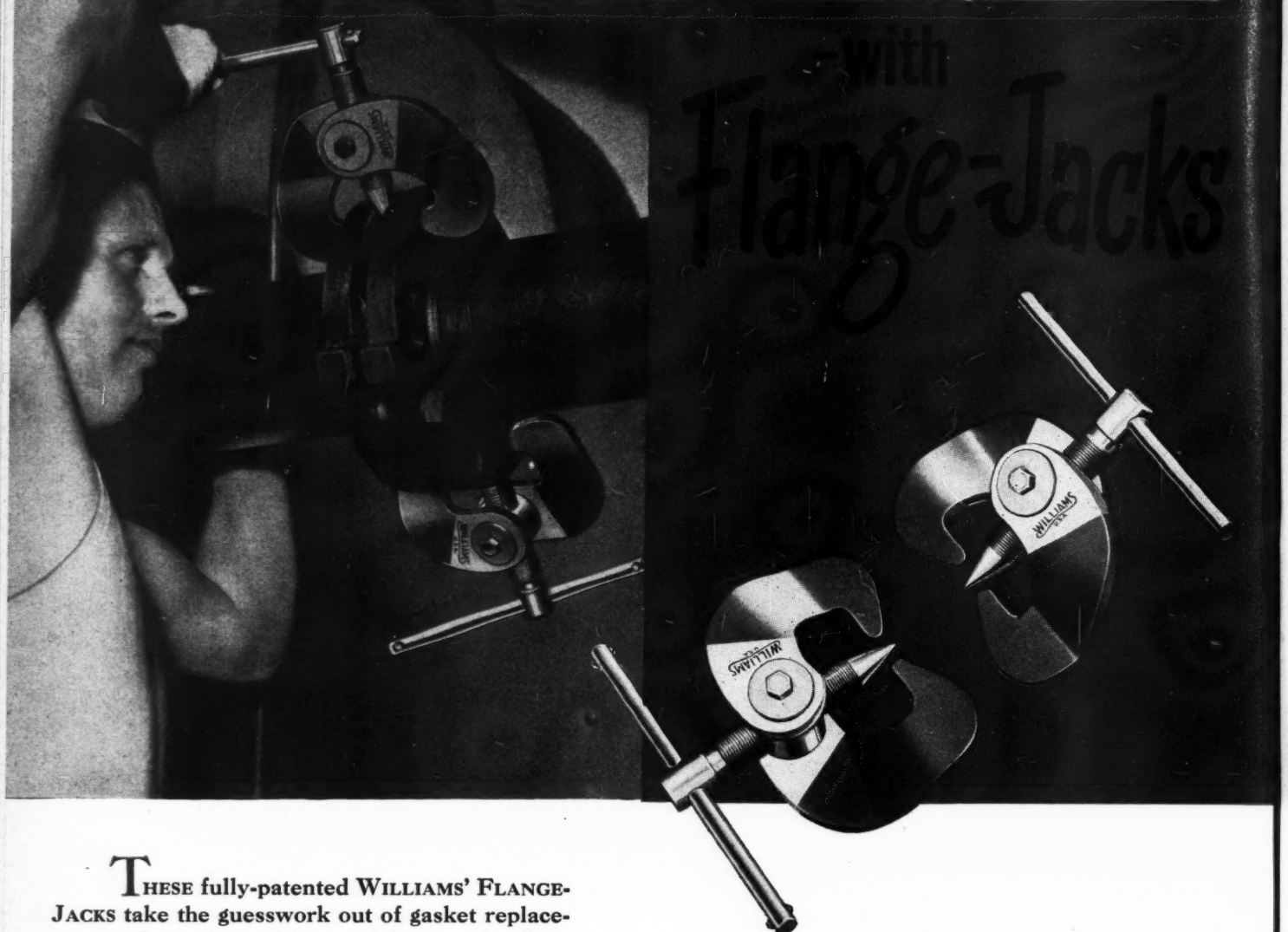
An engineer could find a lot more bugs, easy.

Seems like an awful lot of trouble as compared with a little gas flame, doesn't it?

Britain Building

THE British gas industry is maintaining the old "chins up" attitude for which England has always been famous. In the shadow of almost certain eventual nationalization, the United Kingdom Gas Corp. Ltd. is going ahead with plans to build new production and distribution facilities at an estimated cost of 4.5 million pounds. When completed, the facilities are expected to carbonize 1,162,000 tons of coal annually for a yield of 22.5 billion ft. of gas plus by-products. The net result will be a doubling of the corporation's present output. The ministry of Fuel and Power has given its approval to the scheme, and seems to have given the corporation at least off-the-record assurance that nationalization of the industry will be postponed until some future date—a date which will not "prejudice" the project.

Gasket Replacement made easier



THESE fully-patented WILLIAMS' FLANGE-JACKS take the guesswork out of gasket replacement. Operating with a minimum of effort, FLANGE-JACKS exert tremendous pressure smoothly and evenly. The flanges are parted quickly and held in perfect alignment without damage to flange faces.

There is no shock along the pipe line, no danger from flying wedges and no sparks are caused by hammer blows. FLANGE-JACKS eliminate costly shut-downs, making possible fast, economical repairs in hard-to-get-at locations.

Ask to see these new WILLIAMS' FLANGE-JACKS at your nearest "Oilwell" store.

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UNITED STATES STEEL

"OILWELL"

TECHNICAL TRENDS

by Guy Corfield

Underground Locations

IT is of course not news to most gas men that there are many underground structures in the streets and parkways, but few may have stopped to realize the magnitude of this "underground traffic." When it is considered that most streets contain many if not all of the structures relating to the supply and service of gas, electricity, water, communications, sewers, storm drains, lighting and signal systems, and that in some instances petroleum, refrigeration, steam and other special conduits are added, it would appear that the commodities transported and the services rendered are at least of the same order of magnitude as those being handled on or above the same streets. Therefore it would seem logical that this underground traffic merits at least as much thought, planning, cooperation and coordination as that above the surface, with respect to orderly and recognized location.

It would appear that there must be a most mutually advantageous location for each type of structure, both with respect to horizontal placement and depth. Orderly arrangement and location would prevent competition for space, with all its resultant inefficiencies, temptations and hardships; would facilitate installation and repairs, which in turn would reduce interference with surface traffic; would minimize damage of one structure by operators of another structure; would assist long term planning; would enable the separation of local services from trunk or "through" services.

Apparently there has not yet been sufficient urge or opportunity for the development and practice of such coordination in American communities, or at least it has not been brought to light in any of our gas industry publications or association meetings. It should be of interest to the industry to note that this matter is being actively considered in Great Britain, and that there has been published a "Report of Joint Committee on Location of Underground Services" dated July 1946, which may be obtained from the Institution of Civil Engineers, Great George Street, London S.W.1, England, post free for the price of 6d. per copy.

This report has been prepared by a joint committee appointed by the Institution of Civil Engineers and the Institution of Municipal and County Engineers, in cooperation with the Institutions of Electrical and Gas Engineers, the Chief Engineer of the General Post Office, the Institution of Water Engineers, the British Waterworks Association, and the Ministries of Health, War Transport, Fuel and Power. Its purpose was "to draw up notes for the use of engineers on the best location of underground services" because "the coming decade will see a large scale re-development of 'blitzed' and 'blighted' areas in the built-up parts of existing towns, a development of the

outskirts of existing towns, and the construction of new towns," and also because "hitherto there has been no general standard adopted for the location of the various services. While in some areas an agreement has been reached on an order in which the mains should be laid, the order is not universal and varies from district to district, while in many areas there is no particular order at all."

The recommendations are developed in some detail, with typical vertical and horizontal sketches. In general, "service mains" are assigned to the "footway" (property line to curb), and the "trunk mains" to the street proper. Sewers are also assigned to the street, subject to recognition of the need for uniform slope and straight runs between manholes, which may necessitate their encroachment on the property line-to-curb space. The placement of service mains, in horizontal order from property line to curb, is as follows: electricity, gas, water, telephone and street lighting; the respective depths to the top of the first four structures are 1 ft. 6 in., 2 ft. 3 in., 3 ft., and 1 ft. 2 in. It is suggested that in new housing estates, where practicable, mains should be laid on both sides of the street.

Incidentally, it is stated that the practice of planting curbside trees in town streets, except in quiet residential areas, should be discontinued unless wide parkways can be provided; and the planting of large trees, more suitable for forest or shelter growth, should be discouraged in city streets because of the deep roots, which are detrimental to underground services.

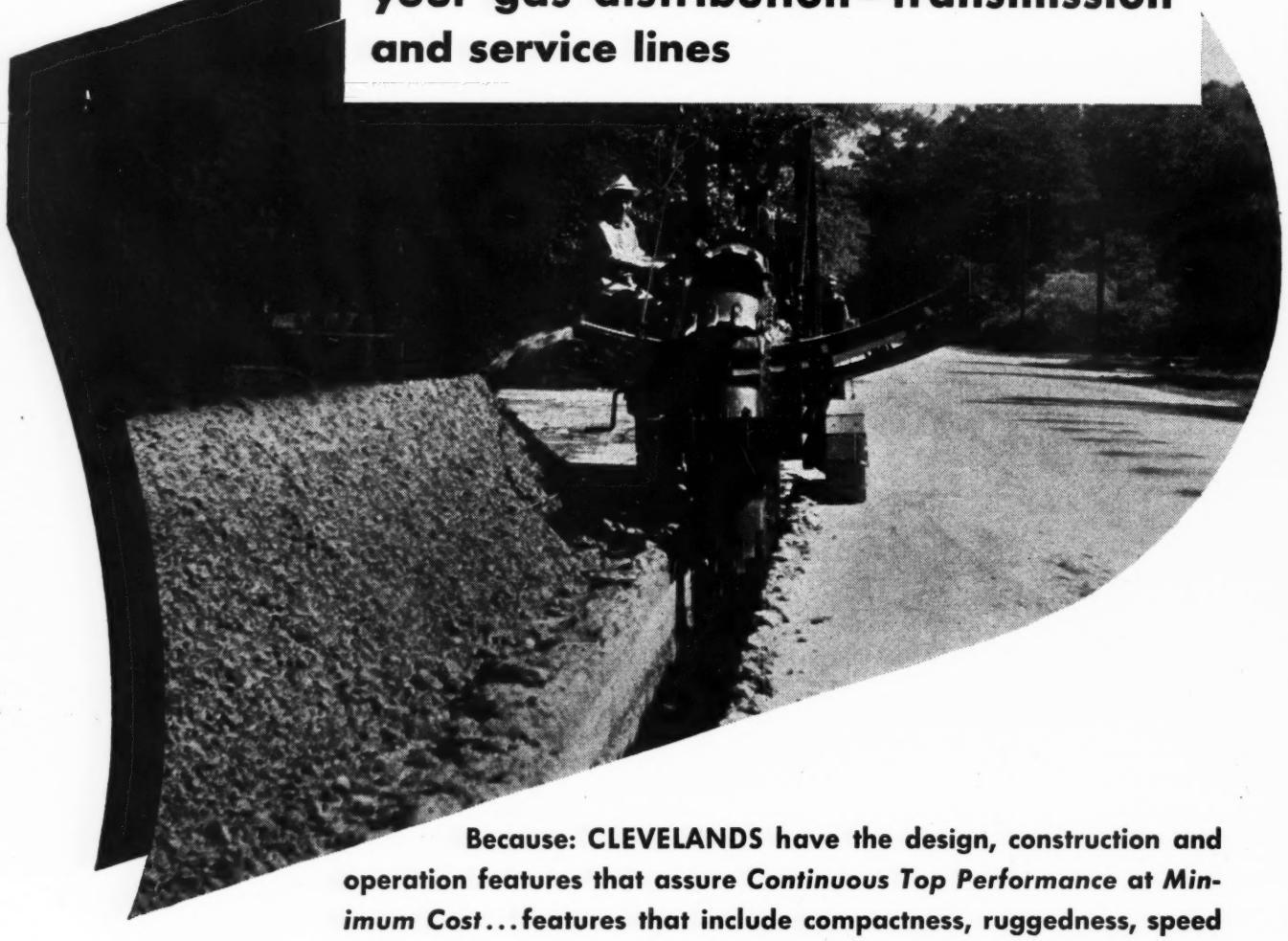
Activated Carbon

IN the March, 1947, issue of this column mention was made of the several uses of activated carbon of interest to the gas industry. More recently it has been announced that a research group has been established at the Mellon Institute, Pittsburgh, to study industrial application of vapor-adsorbent activated carbon.

Studies will be made to improve equipment and processes for recovery of solvent vapors, develop methods for purification of industrial gases and deodorization of air, and investigate the separation of materials in the vapor phase. A pilot plant for solvent vapor recovery has already been installed.

You need a CLEVELAND

when you need trench quickly for your gas distribution – transmission and service lines



Because: CLEVELANDS have the design, construction and operation features that assure *Continuous Top Performance* at *Minimum Cost*... features that include compactness, ruggedness, speed and mobility... features that for 25 YEARS have proven their worth as attested by CLEVELAND'S dominant position in the GAS INDUSTRY where so many companies have accepted them as a standard tool.

FOR FULL DETAILS CALL KEnmore 4100

PROMOTIONAL NOTES AND NOTIONS

by Stanley Jenks

National Convention

IT hardly seems a year since we held our first post-war national convention at Atlantic City. Then, the joy and relief of peace produced an exuberance only dampened by the loss of old-time friends throughout the war years.

The appliance and equipment display was a record-breaker, even though one manufacturer was distributing "We got plenty of nothing" cards, and, with a few exceptions, most exhibitors had their post-war developments under wraps. In brief, last year's convention was strictly an interim affair. All of us had been beating our brains out in the war effort. We felt the post-war world had some kind of future, but we cautiously wanted to see just how much of the glitter and glamor of the post-war prognosticators (Pipe Dreams Unlimited) were justified.

Now, a year has passed, and a much better defined pattern of what lies ahead is available. Like every other basic industry, we are short of materials. In the manufactured gas field, we stand by unable to handle the demand because we lack the material needed to provide the additional service demanded. Furthermore, inflation has laid its clammy hand on our rate-regulated industry.

In the natural gas industry, the Federal Power Commission, in the year ended last June 30, has authorized pipe line construction totalling $273 million, with an additional capacity of 2 billion cu. ft. daily. Unfortunately, there is little pipe available, and most formal delivery promises are still more than a year away.

Appliance manufacturers have been remarkably successful, under the circumstances, in boosting their production. They have shown rare wisdom too in their conservatism, shall we say, for want of a better word.

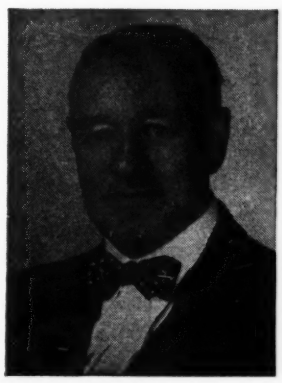
Any product, of course, can be improved—if price is no factor. But for value received, the gas appliance manufacturer has always been tops. Why, with a basically excellent product, make changes just for the sake of making something different? A gas appliance is primarily a utility, built for maximum durability, dependability, and efficiency. Any change at the expense of these factors would be a step in the wrong direction.

While the future is still clouded, the main job of this year's convention in Cleveland will be to clarify it.

New Housing

THE optimists tell us 700,000 new homes will be completed this year and that 1948 promises to be a home-building record year. Apparently a home-starved public is at last realistically realizing that the 1939 dollar has been permanently clipped. In other words, in unregulated industry, Mr. and Mrs. John Q. Public pay the increased labor costs.

For years, it has been a sound policy of the AGA to keep the architect posted on the merits of gas service. Thousands of new homes will be built, however, without the ostensible benefit of an architect. But, behind every home, there will be some creative brain anxious to meet local conditions as ably as possible.



It is a safe generality to assume that the cost factor will promote a more economical usage of space. The profligacy of the cheaper labor days will no longer be in evidence.

For example, the coal people, for very good reason, are quite worried, because in many instances no provision is being made for coal bins.

John L. Lewis having effectively levelled off the competitive price gap, why shouldn't we take full advantage of the compactness of gas equipment and persuade the builders to make as many homes as possible first-class examples of the leadership of gas in today's home of tomorrow?

Air-Conditioning

IS the radiator doomed in homes?

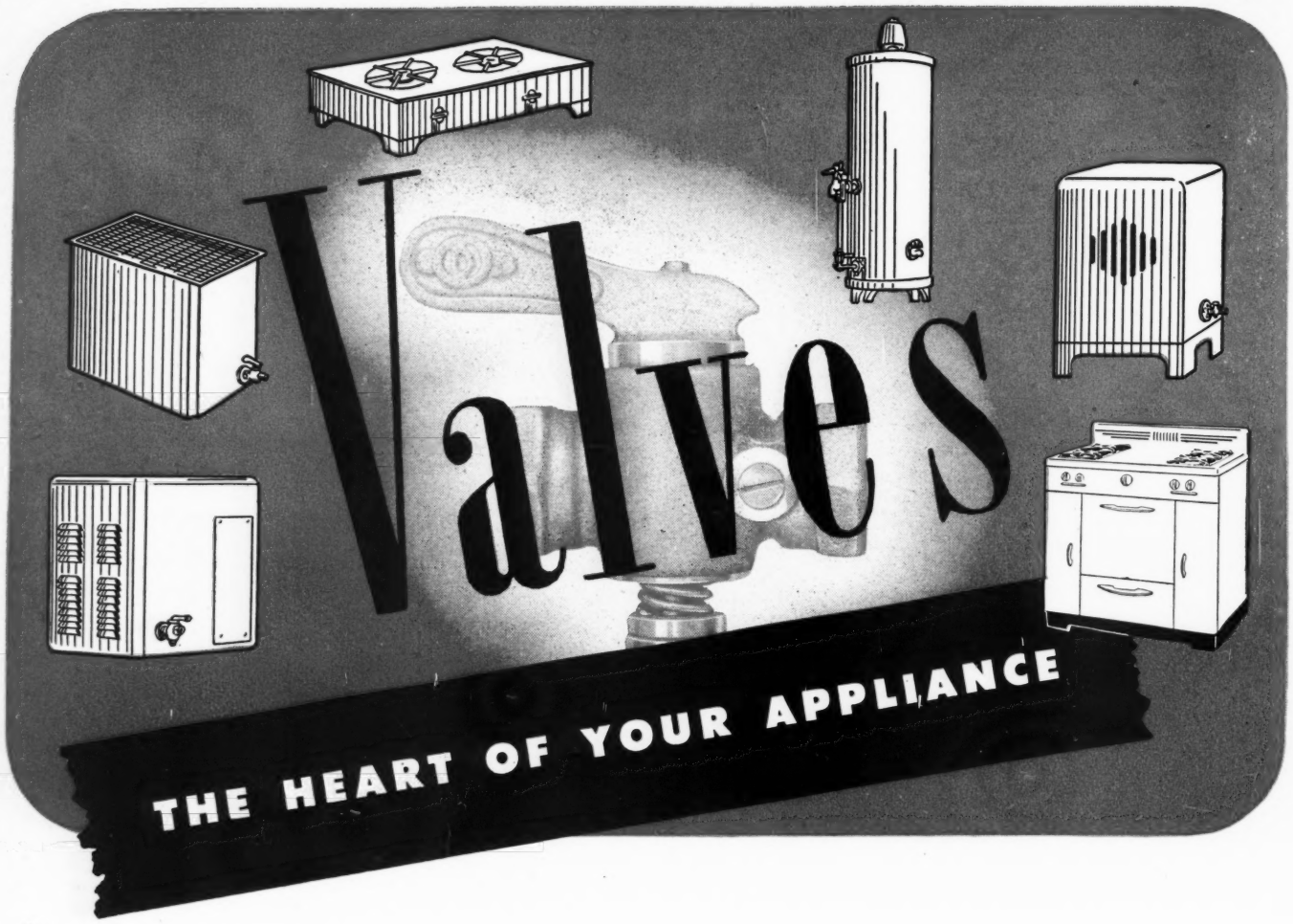
A canny realtor friend thinks it is, because it belongs to a too inflexible system of heating with all-year-'round air-conditioning in the offing as the next major development in home comfort.

It is readily conceded there is precious little air-conditioning in a steam-heated home with relative humidities as low as 10% (drier than the Sahara Desert), which was a common condition in my home until a portable motor-driven humidifier was installed. And radiators in themselves aren't exactly the last word in aesthetic appeal.

Of course, every promotion man appreciates that a substantial part of his job is creating obsolescence to clear the way for modern equipment.

My realtor friend thinks that any home not equipped with year-'round air-conditioning equipment will be obsolete in the next 10 years. Even if he is only partially right, it sounds encouraging.

Since the gas industry has such a big stake in the successful promotion of year-'round air-conditioning, it would be as well if thousands of other realtors felt the same way. Any encouragement we can give them along this line will be in an excellent cause, because air-conditioning is the best bet yet to fill in that summer valley—the biggest economic bane in the industry today.



BE SURE THEY'RE THE BEST

Your appliance is as good as the valves you use. Ultimate consumer reaction is influenced by valve efficiency and dependability.

Materials, workmanship and engineering knowledge incorporated in your appliance demand valves of comparable calibre—valves that not only enjoy the long-standing recognition accorded to Detroit Brass products, but also valves backed by the assurance that they are designed to perform for the life of your appliance. That's why we say—

BE SURE THEY'RE DETROIT BRASS

GAS VALVE DIVISION

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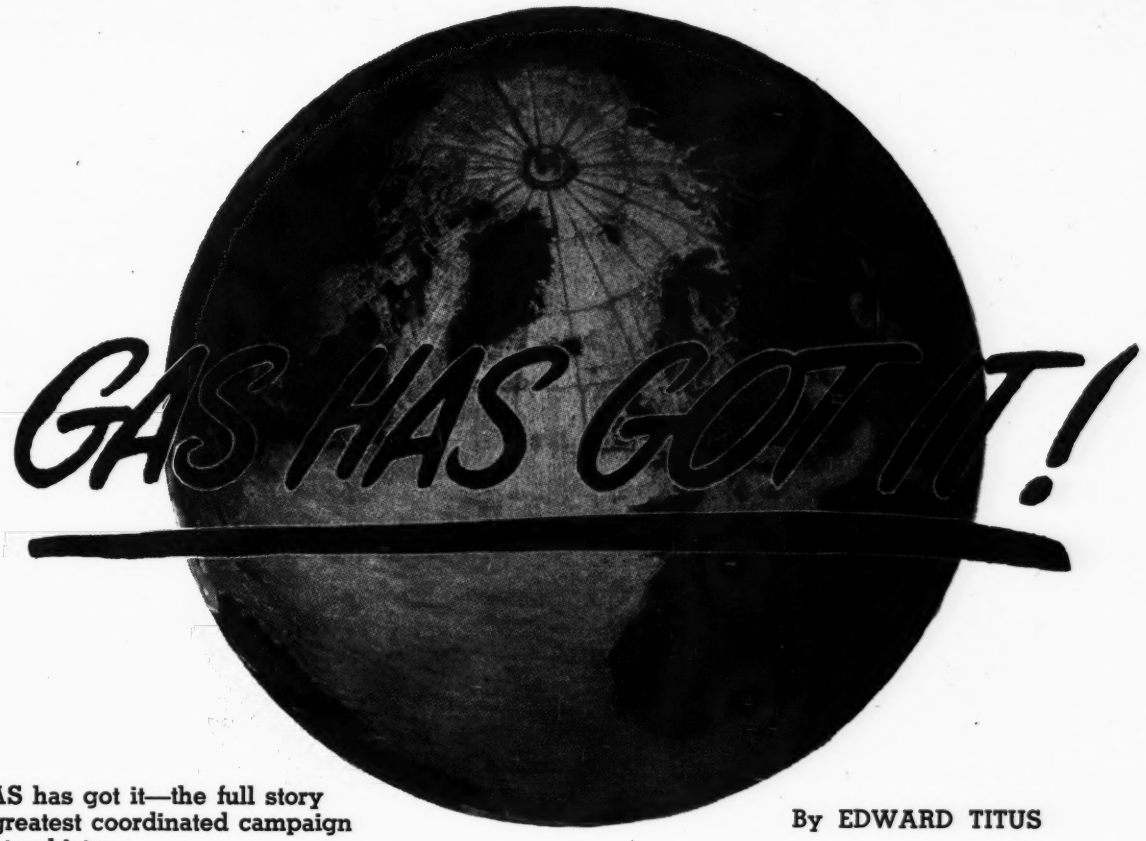


And GAS has got it—the full story on the greatest coordinated campaign in industry history.

By EDWARD TITUS

THIS is the gas industry's most colossal battle against ignorance.

Yes, Gas Has Got It. But the women of America don't know it yet. That's the challenge the industry is meeting with the Gas Has Got It campaign. It is the greatest, best coordinated gas advertising and promotion campaign ever launched, and the first campaign to unite the whole industry, including utilities, dealers and manufacturers.

What are the facts?

Automatic gas ranges of "CP" quality first were made available in 1938. Yet today, after nine years, 68% of the women of the United States either do not know about the automatic and other features of the "CP" range, or —even more disturbing and deplorable—they believe that electric equipment has many of these features to a greater degree!

Half of these women have gas ranges 10 years old, and one quarter of them have ranges more than 15 years old. What a market for new ones! But these old and, by modern standards, inefficient, hot and dirty ranges constitute the greatest and most effective body of salesmen that the electric industry has.

Now that postwar production is reaching the point where the consumer again has a choice in her selection of ranges, the time element is terrifically important. It would involve great risk to wait until next year or the year after to change the thinking of present and prospective users. Something drastic must be done. Shock tactics must be employed. The need is national in scope, and therefore is being met by an attack carried out on a national scale.

As one speaker put it a few weeks ago:

"For years we have gone along serenely thinking, hoping, trusting—rarely being sure—that we were giving the public what it wanted; that we were giving it the things the competition could not give; and that the public knew we had everything that competition had with a lot of plus features.

"Whether we were right or wrong in the past matters little now. What does matter is that for the first time in the history of our industry, we are now sure of what the public wants and why it is wanted."

And we know that Gas Has Got It!

The Elmo Roper organization, retained by the AGA for the survey, interviewed men and women on gas lines in large cities, medium-sized cities, small cities, and even villages. The interviews were conducted in manufactured gas territory, natural gas territory, and mixed gas territory.

The biggest complaint found by the Elmo Roper people about the old gas range was simply that it was "too old" or just plain "worn out." About 28% of those using gas ranges appear to be vulnerable to the sales persuasion of electric range promoters.

Spurred by the alarming and challenging revelations of the Roper survey, the industry is now at the beginning of the Gas Has Got It campaign. The ground work has been laid at 11 regional meetings held in 11 cities throughout the country in September.

The first speaker at these meetings said:

"By far the most important findings of the range section of the Roper survey concern the features women most desire in new ranges. . . . There are nine of these most desired features. And nine times we can say 'GAS HAS GOT IT'. These nine points deserve your most concentrated attention. But that is not enough. You're going to have to act on these facts."

First of the nine things women want most in ranges was found by the Roper organization to be "Adequate

Part of the crowd that attended the kickoff meeting in New York Sept. 3. Ten other regional meetings held throughout the country got the campaign off to a flying start.

automatic cooking features." Seventy-eight per cent of them said so. And Gas Has Got It.

Number Two in women's range desires is "More modern conveniences." And once again Gas Has Got It with glass oven doors, lights in the oven, griddles for frying operations, towel dryers, crisping bins, timers.

Number Three is clean ranges and clean kitchens, with most emphasis on the range. On this point, we know that the modern automatic gas range has increased the cleanliness of the range and the kitchen, with its smokeless operation and its easy-to-clean pans and trays. And the oven is a cinch for the busy housewife, too, with its rounded corners, its smooth interior finish. Outside porcelain wipes clean with a swish of a damp cloth and even top burners are arranged with easy-clean features, many with trays to catch crumbs and spillovers. Once again Gas Has Got It.

Feature Number Four that women want in their ranges is a quality called "easy to cook on." If they mean control, flexibility, cooking without potwatching, or speed, Gas Has Got It. What could be easier to cook on than a modern automatic gas range?

The Fifth big feature that women want is that a range shall cook foods better. Does anybody doubt that Gas Has Got It? Just think of a juicy, luscious, flame-broiled steak. Or a pot of flavorful vegetables—waterless cooked on the flexible heat of the gas top burner.

Number Six on the parade of features is speed.

"If there's an electric spy in the audience," challenged the opening speaker, "I dare him to open his mouth on this one. *Gas Has Got It* by minutes. Remember the 12% of electric range users in the Roper survey who complained that their ranges were too slow?"

Number Seven desire is for a cool range and cool kitchen. Gas can be adjusted for just the exact amount of heat needed for any cooking job without the waste which is inevitable when the cook has only a choice of a few heat settings.

Number Eight on the list gets down to the matter of cost, the particular desire being "Least cost to operate." That's a walkaway for gas.

Last of the Big Nine Points is another cost factor—least cost to buy new. Any way you figure this one, Gas Has Got It. Price-for-price, right up to the range equipped with all the features one can think of; feature-for-feature, it costs less to buy a gas range.

Gas Has Got It. But women just don't know that Gas Has Got It.

Don't worry. They will.

Barrage Of Advertising

THE Gas Has Got It Campaign is a natural to change incorrect thinking by women about gas ranges. It aims first to change opinions by replacing fancies with facts. It seeks to correct misconceptions and re-convert public opinion, and sets in motion an industry-wide drive to re-energize gas company personnel and dealers, distributors and their forces. It involves a barrage of forceful advertising and accelerated point-of-sale activity backed up by every type of promotional tie-in for gas companies, manufacturers, distributors and dealers.

To understand the campaign's full impact, one must visualize this 1947-48 drive as a three-way offensive. It is to be spearheaded by the AGA's national advertising program; augmented by an increasing volume of national and regional advertising by "CP" manufacturers; and expanded at the point of sale by gas companies, distributors and dealers in their local advertising and promotional activities.

To change negative thinking into positive acceptance of automatic gas ranges, the association's national advertising campaign for the year beginning Oct. 1 has been set at $800,000 and the domestic gas campaign has been radically revised to focus heavily on the operating and convenience features of modern gas ranges as exemplified by those built to "CP" standards.

A $200,000 concentrated advertising drive has been scheduled for October, November and December, 1947. And there will be a continuing program during the first nine months of 1948.

The fall campaign is built around the theme "The New Gas Ranges Are Really New" and the slogan "Gas Has Got It." Black and white full pages, 2/3 pages and 1/2 pages will appear in the following:

Saturday Evening Post	McCall's
Life	Woman's Home Companion
Collier's	Better Homes & Gardens
Ladies' Home Journal	American Home
Good Housekeeping	Parents'

The $200,000 spent on this introductory drive will buy 29 insertions, resulting in a total of 98,423,000 impressions or messages.

The national consumer advertising tentatively planned for January to September 1948 will continue to highlight the automatic gas range built to "CP" standards, and will

THE 9 POINTS THAT WOMEN WANT GAS HAS GOT

1. **Best automatic features**
2. **More modern conveniences**
3. **Easy to keep clean**
4. **Easiest to cook with**
5. **Cooks foods better**
6. **Cooks things quicker**
7. **Cool in operation**
8. **Costs less to run**
9. **Costs less to buy new**

concentrate strongly on the superiority of gas in doing the cooking job. There will be 27 or more full-page insertions, resulting in 90,958,000 or more impressions or messages. This advertising will appear in:

Life	McCall's
Collier's	Better Homes & Gardens
Ladies' Home Journal	Woman's Day
Good Housekeeping	Family Circle

The total circulation of all magazines to be used during the 12 months is 37,465,000. There will be 56 or more insertions and total impressions or messages will come to at least 189,380,000.

Copy and art work for the entire program will be based on the nine features which women desire most in a new range, as revealed by the Roper survey.

This enlarged campaign of the association, however, will not in itself be big enough, nor can its objective be achieved quickly enough to do the job that must be done. The manufacturers of "CP" ranges will also be telling their story on a bigger scale than ever before.

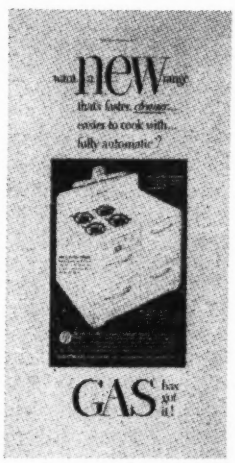
For the manufacturer who does or intends to do national advertising, the association makes the following proposition:

To make it worth while for him to initiate or to increase substantially his national advertising to promote acceptance of his "CP" range, the association will feature his range and carry his brand name in its national advertising in proportion to the total amount he agrees to spend in 12 months on national consumer advertising, provided his expenditures for preparations and publication of national advertisements exceed $50,000. The association also has another proposition for the manufacturer who does not advertise nationally.

The ads shown at the September regional meetings featured ranges of some of the first manufacturers to execute the pledge form accepting the associations's proposal.

The earliest insertion is a full page ad in Life magazine for Sept. 22, featuring the Magic Chef Range. The ad lists 10 ways in which such a range is easier for top-of-stove cooking, and 10 ways in which it is better for baking and broiling.

Number two in the fall series is entitled: "Your Best Buy Is a New Automatic Gas Range!" In the upper left hand panel appear three headings, with descriptive copy under each—Lights Without Matches—Broils Without Smoking—Even Cooks a Meal While You're Out of the House! This full page ad appears in the Ladies' Home Journal for October, with a Caloric range illustrated.



The American Home for October carries a full page ad headed "6 Questions to Ask Yourself before You Buy a New Range." Then follow the six questions with supporting copy under each—Which Will Give Me Best Cooking Results? Which Will Save Me Most Kitchen Time? Which Has Most Modern, Automatic Features? Which Makes Cooking Cleanest and Coolest? Which is the Most Economical to Operate? Which Has the Largest Variety of Models? The panel at the bottom shows a Tappan Gas Range, and the "CP" seal. The sign-off message reads, "For Faster, Finer, Fully Automatic Cooking . . . Choose a New Gas Range!"

Scheduled for a half-page in the Woman's Home Companion for October is an ad illustrating the Roper Gas Range. Large-size type is used. At the bottom of the ad is the statement: "You get everything in the amazing New Gas Ranges!"

Opening shots. These ads appeared respectively in October "American Home," Sept. 22 "Life," and October Ladies Home Journal.

Another early ad in the fall series is the one to appear in half-page size in Better Homes and Gardens for October. In the left hand column at the top it says "What You Want the New Gas Ranges Have!" The right hand column has eleven check-marked features that are outstanding. The range illustrated is a Grand, and the copy again promotes the significance of the "CP" symbol. The ad closes with the assertion "Gas—Now First For Modern Automatic Cooking."

A sixth ad features the provocative question in the heading at the top—Want a New Range That's Faster, Cleaner . . . Easier to Cook with . . . Fully Automatic? It is a half-page insertion appearing in McCall's Magazine for October. The range illustrated is a Universal.

Manufacturers participating in the campaign will have AGA ads assigned to them throughout the entire 12 months, not the fall series alone.

An all-important phase of the campaign is the part to be played by gas companies. It is a rare occasion when a national advertising campaign is easily adaptable to local use, with perhaps only minor normal changes needed to make it entirely local. Coast-to-coast reactions have shown that gas company advertising and sales personnel will use the national theme, art and copy extensively in local promotion.

Here is a ready-made opportunity for the entire gas industry, perhaps for the first time in history, to unite on one theme for a definite period of time, and hit it hard. Gas companies have been urged to run a full schedule of newspaper advertising to support and localize the campaign.

The newspaper advertising tie-in can be accomplished in a majority of cases by a re-arrangement of existing advertising schedules or a slight additional appropriation. This means just the assignment of normal local advertising budgets to this one campaign during its life. If, in addition to newspaper advertising, local companies will stress the new Gas Has Got It story in direct-mail, posters, or other media regularly used by them, then the gas industry will really be using shock tactics.

Those on the local firing line will be serviced by the manufacturers with reprints of the national or regional AGA ads which feature their ranges and brand names.

The manufacturers also will provide them with newspaper mats of those ads and other practical tie-in material.

To accommodate those companies which originate their own advertising, the AGA will make available to them photographs of all elements of its own ads.

The above tie-in material will be provided by the manufacturers and the AGA for the introductory fall campaign of advertising, as well as for the series of ads which will follow in January and extend through September 1948.

Throughout the Gas Has Got It campaign, radio figures as an important word-of-mouth weapon in the battle against ignorance.

And a new television program "Gas Has Got It" was arranged by the AGA, together with Servel, Inc. and Cribben and Sexton Co. for Station WABD, Sept. 17 from 8 to 8:30 p. m. The stage and television team of Paul Winchell and Jerry Mahoney, a ventriloquist duet, was selected to tell the story of the New Freedom Gas Kitchen.

More October ammunition. At left, "Woman's Home Companion" ad; and "Better Homes & Gardens" insertion.

The Promotion Bureau of the AGA has announced that a sample recording has been prepared of a 15-minute radio program designed for use locally, both to tie in with the present Gas Has Got It campaign, and for later use with other campaigns. The title of the radio program is "The Wonder Flame Program," featuring Mary Margaret McBride in celebrity interviews.

The actual interview of a celebrity will take 12 minutes. Miss McBride will devote a minute and a half to a sales presentation on some phase of the gas industry. The remaining minute and a half is left for the local gas company to have the station announcer make any announcement desired. During the period of the Gas Has Got It Campaign, it is planned that Miss McBride will stress the nine points of superiority of the "CP" range. The program is designed for weekly use during the daytime for women audiences. The AGA secured an option on Miss McBride's time, and final arrangements awaited signing up of companies by Sept. 26.

Throughout the country utilities will be stressing Gas Has Got It in their local programs. As an aid to them, the AGA's Promotion Bureau will provide commercial radio announcements of various lengths tying in with the campaign. In addition the Publicity Bureau of the AGA has an extensive program of supplying radio scripts to women commentators and background material and other scripts to stations.

GAMA Hits At Ignorance

SETTING the keynote for the manufacturers' part of the Gas Has Got It Campaign, a "CP" range manufacturers' representative at a September regional meeting, said:

"The Gas Appliance Manufacturers Association estimates that with 10 million gas ranges now in use which are more than 10 years old, and with 8 million more gas ranges now in use which will become more than 10 years old within the next five years, the potential demand for gas ranges in the United States and Canada may exceed 25 million units by 1950, if you do the right kind of a sales job."

On the question of supply of ranges, manufacturers' representatives made the following points:

1. By the latter part of the year, they hope the steel mills will be able to give them a quantity of steel needed to run their plants at somewhere near production capacity.
2. Most manufacturers hoped to have at least one floor sample automatic gas range on utility and dealers' floors by Oct. 1.

Answering the contention of some that the Gas Has Got It program should be postponed until ranges are available in unlimited supply, speakers stated:

"If you stop and think a moment, you will realize the importance of preselling our customers now with just such a program, and of conditioning the market for the hard-selling days ahead.

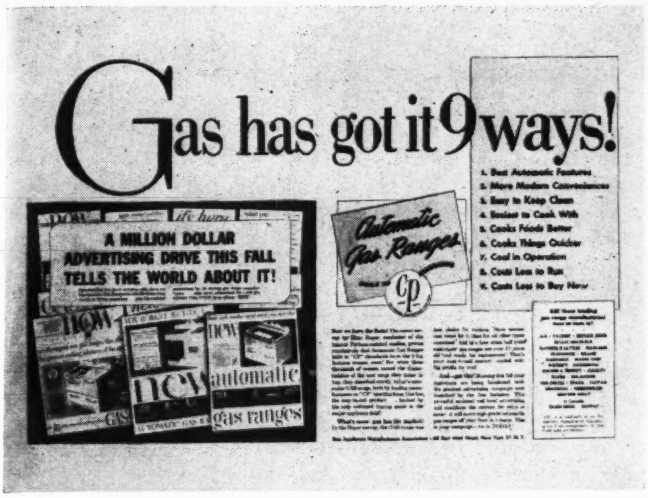
"Orders are signed on sales floors, but sales are made in your prospects' minds long before a pencil touches an order blank. If we are to put into our customers' homes next year, or the year after, or the year after that, the kind of automatic gas ranges we want to see there, we must start creating the desire and making sales in their minds' eye today and every day. This 'Gas Has Got It' campaign is designed to pre-sell your customer and to condition the market for years to come."

The manufacturers have promised utilities and dealers that they will be amazed at the number and variety of their Gas Has Got It promotional projects. There will be national and local advertisements, ready-to-run newspaper mats, booklets, counter and floor displays, outdoor posters, radio scripts, hand-out pieces, reprints, mailing pieces, cook books, recipe sheets, slide films, moving pictures, house service and sales helps, training programs, and other advertising and promotion material which utilities and dealers will receive from every manufacturer.

The "CP" manufacturers are spending more than $1.5 million in national and regional magazines in the 12 months starting Oct. 1 to tell the world that Gas Has Got It, and to promote their own models. In addition to this national and regional advertising, these manufacturers will spend nearly $1.5 million more in the same period to provide utilities and dealers with displays, booklets and other promotional material featuring their line and individual models. And the 20 "CP" manufacturers will spend several hundreds of thousands of dollars in dealer cooperative advertising in local newspapers, radio programs and other such activities. All this does not include the money that will be spent in dealer meetings, trade exhibits, home shows and the like.

It adds up to about $4 million that is being spent in 12 months by individual "CP" manufacturers. The nine points that women want in their ranges, as brought out by the Elmo Roper survey, will be the keys which every manufacturer will use in his promotion to tie into the AGA national advertising.

The "CP" manufacturers as a group have assumed responsibility of selling dealers on the profit possibilities of tying into the Gas Has Got It program. Double-page spreads in color will appear in seven dealer trade papers, and advertisements will be run in the two most important home economist magazines. Under the Gas Has Got It slogan, headings of paragraphs in the first ad are "Gas Has Got the Product," "Gas Has Got the Market," and "Gas Has Got the Promotion."


Gas has got it 9 ways!
A MILLION DOLLAR ADVERTISING DRIVE THIS FALL TELLS THE WORLD ABOUT IT!
Automatic Gas Ranges
1. Best Automatic Features
2. More Modern Conveniences
3. Easy to Keep Clean
4. Easiest to Cook With
5. Cooks Foods Better
6. Cooks Things Quicker
7. Cool in Operation
8. Costs Less to Run
9. Costs Less to Buy Now
NOW
automatic
gas ranges

A GAMA contribution to the campaign is this ad, one of several which are appearing in trade publications for dealers.

As a dealer broadside, the first GAMA trade paper advertisement has been reproduced in a 14-in. x 16-in. brochure. Copies are available for manufacturers and utilities to distribute to their dealers at 5 cents each. Also available is a set of "CP" specifications in general form for utilities and manufacturers to use in describing the "CP" specifications and "CP" program to dealers and consumers. This material is available at 2 cents each.

GAMA also is preparing a series of six cartoon advertisements suitable for use by utilities to supplement AGA mats and manufacturers' material. Illustrations will be two columns wide and can be used in two-column 4-in. advertisements or as the main illustration in larger advertisements.

Weapons Of Publicity

ANOTHER vital element of the Gas Has Got It campaign will be the publicity program. The negative thinking regarding gas services and gas appliances as exposed by the Elmo Roper survey can be attributed in no small part to a lack of publicity in the last decade concerning the advantages of gas. As the speakers at the September meetings expressed it:

"We felt that we had the better mousetrap. The world was going to continue to beat a path to our door. It was an idyllic state of mind.

"Unfortunately our competitors failed to believe that we had the best mousetrap. They had one streamlined and in chrome, and they told the world about it. And many believed."

To bring the world back to our door, the Publicity Bureau of the AGA is prepared to preach the gospel of Gas Has Got It through every possible medium. National magazines, trade magazines, radio and newspapers will be constantly supplied with variations of the nine cardinal points in which gas excels.

Photographs, background material, catalogue information and individual features on modern, automatic gas ranges have been furnished and will continue to be furnished to the leading national magazines in the women's field. Contact work with the editors of these magazines is being carried on. Results are being seen this fall in publications like This Week, Better Homes and Gardens, McCall's, Parents Magazine, Woman's Home Companion, Practical Home Economics, House Beautiful, House and Garden, American Home, and What's New in Home Economics. Each of these magazines can be expected to carry stories on gas equipment, principally automatic gas ranges, in one of its fall issues. Business and allied trade magazines also will be covered on the publicity front.

The Publicity Bureau of the AGA is now mailing radio scripts to more than 950 women commentators who signified by post card their desire to receive informative material on domestic uses of gas. Background material will be furnished to the larger stations and complete scripts to the smaller radio stations.

In the chain of Gas Has Got It publicity which is being forged across the country, newspapers constitute a most important link. Over-all newspaper stories stressing modernity, cleanliness, convenience and other important features of automatic gas ranges have been prepared. Specific stories on top-burners, automatic lighting and cooking control, broilers and ovens and other features of modern gas ranges are ready for editors of women's pages.

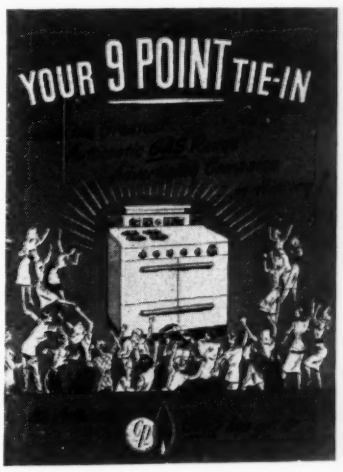
In connection with radio and newspapers, the Publicity Bureau of the AGA earnestly seeks the aid of its gas utility members. In a section of the campaign portfolio on publicity will be found mimeographed releases covering nearly a dozen advantages of modern automatic gas ranges. Utilities are requested to use these releases as a tie-in with their local newspaper advertising.

It is suggested that publicity representatives of utilities present these releases in their present form, or a revised form, to the editors of newspapers used in their advertising campaign. The factual information in the releases can be disseminated further through stories in house organs and employee publications. It can be woven into talks and demonstrations by home service departments. The releases can form the basis for talks and lectures before women's clubs and parent-teacher meetings.

Also included in the portfolio are sample radio scripts. Gas utility companies now carrying radio programs are urged to utilize the information contained in these scripts in their own programs either as plugs in commercials or as part of the regular programs of those companies using commentators. Companies not using radio as a regular promotional feature can help the industry and themselves by forwarding these scripts to their local broadcasting companies for background use by commentators on sustaining programs with a woman's angle.

Readers place great faith in the columns of their local newspapers. More than 20 million women read the women's pages of daily and weekly papers. A tremendous number listen to local radio programs. Thus the releases and radio scripts in the Gas Has Got It portfolio can serve to tell every woman in a utility's territory that Gas Has Got It.

We have covered above the challenge presented by the Elmo Roper survey, and how the Gas Has Got It Campaign will meet that challenge through the national advertising and promotion of the AGA, through the advertising, promotion, and tie-in program of GAMA, and through the AGA's publicity program. An additional all-important part of the program is the nine-point promotional tie-in. This is covered on the next two pages.

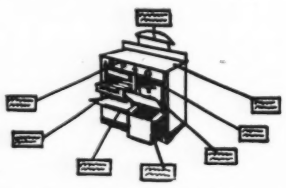


NINE-POINT PROMOTION TIE-IN

A highly essential part of the Gas Has Got It campaign is the Nine-Point Promotion Tie-in. This will carry the campaign right through to the customer at the point of sale, to the dealer, to salesmen, and to school pupils, who will be the purchasing consumers of tomorrow.

On these two pages we present a summary of the nine tie-in points, telling how each gas utility can put the advertising and promotion to work in its own territory. The campaign portfolio provides further information, and tells how to secure the material for the tie-in.

1. Set Up a Live Floor Demonstration



THE basis for such a demonstration is an actual model of one of the new "CP" ranges, one unit of which the manufacturers hoped to have in the hands of each utility and dealer by Oct. 1. A floor display as pictured in the portfolio can demonstrate right before the most skeptical consumer's eyes the points of cooking perfection of the modern automatic CP gas range. Utilities are urged to place such displays on their own floors, and to make every possible effort to obtain similar displays on every gas range dealer's floor. The display can be made by the utility's display department or local display house. It can include a large banner, easel sign, arrows pointing to the nine points, or circles or panels with ribbons running to the points on the range.

The nine points suggested for demonstration in the floor display, follow:

1. Automatic time control.
2. Speed-simmer top burners.
3. Top burners light automatically. (Glass utensils with colored water kept at simmer heat give fine opportunity to demonstrate automatic lighting, speed-simmer burners, and instant heat. Small squares of fast-colored fabrics added to the water will show gentle boiling action of simmer heat, and quick surge of instant heat when burner is turned to full flame.)
4. Modern smokeless broiler. (Pour water in grid to show how the grease runs into lower pan out of reach of flame, making smokeless broiling possible.)
5. Automatic oven heat control.
6. Cooks whole meal in oven—automatically.
7. Broiler lights automatically. (Mirrors or polished metal reflectors in drawer under oven burner will enable demonstrator to show how oven heat control functions. Turning dial from low to high heat will make burner come on full. Flame reflected in mirror will let prospect see burner action. Also a good way to demonstrate automatic lighting of oven and broiler burners.)
8. Oven lights automatically.
9. Insulated oven for a cool kitchen. (Remove door lining or body side to show insulation.)

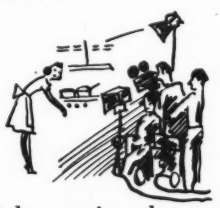
2. Use Window, Floor and Outside Display

EFFECTIVE display cards and posters are available for the Gas Has Got It campaign. These include a full color 24-sheet poster by Schmidt Lithograph Co., for outdoor billboards. The poster shows an attractive, smiling little girl, admiring a beautifully browned turkey cooked by gas. The copy reads "Automatically yours, with a new automatic gas range," and "Flame-perfect Gas."

Window and floor display cards available include lithographed 40-in. x 60-in. and 30-in. x 40-in. cards in color by Bishop Publishing Co. Food scenes from the motion picture "Winning Seals of Approval" are reproduced in color on each. The largest card shows a girl flying high on a bird, the copy reading "You'll be flying high fastest, when you do the cleanest cooking in your life on your easiest New Automatic Gas Range." Copy on the two smaller cards reads "Make life rosier by enjoying faster, finer, fully automatic cooking with your New Automatic Gas Range," and "You'll be blushing from compliments when you enjoy the greatest cooking advances of the age with your New Automatic Gas Range."

Other display cards are offered by Timely Service, Inc. Blow-ups of national advertisements for floor, window and dealer use also are available.

3. Arrange Showing of Full-Color Film "Winning Seals of Approval"



PRODUCED under the direction of the Promotional Committee of the AGA, this film gives star billing to automatic gas ranges built to "CP" standards. Seventy-five scenes in the AGA laboratories show some of the more than 600 tests approved gas ranges must pass. Prints of the film will be loaned to companies contributing to the Research and Promotional fund. Prints will be sold at cost ($95) to any interested gas company. The film demonstrates by showing special features of "CP" ranges, the fact that they have the nine points most desired by women.

The following ways to show the film to sell automatic gas cooking are suggested:

At group meetings of company employees, dealers, plumbers; at sales training for gas company and dealer salesmen; before women's and parent teacher clubs; at cooking schools and home service demonstrations; before Girl Scouts and church clubs; at home economics classes in schools; at night school for adult education.

A special folder sums up the story of automatic cooking with gas as shown in the film. Pass-out copies are available to give to audiences.

Servel New Freedom Gas Kitchens are used in the film to show the gas range at work. Other scenes portray a factory production line, home economists in test kitchens, work in a range manufacturer's laboratory, and inspections in factory and warehouse.

4. Give Every Homemaker "Food Is Fun" Booklet on Automatic Cooking With Gas

"Food Is Fun" is a new illustrated consumer booklet on automatic cooking with gas. Creative cooking sets the theme. Basic master recipes with suggested variations en-

courage the homemaker to experiment and cook more. The booklet contains many time-saving suggestions. All pages with recipes or menus include clever selling of the superiority of automatic gas ranges. Chapters are included on advanced methods of top cooking, broiling, roasting, baking.

In connection with the Gas Has Got It campaign, "Food Is Fun" can be distributed at cooking schools, floor demonstrations, etc. It can be offered free in newspaper advertising to attract visitors to cooking demonstrations on gas company and dealer sales floors.

5. Intensify Consumer Education

A special plan folder called "Home Service Puts Over the Automatic Gas Range" is under preparation by the Home Service Committee of the AGA and was scheduled to be mailed to home service departments of gas companies about Oct. 1. The tie-in plan for this part of the program includes the following points:

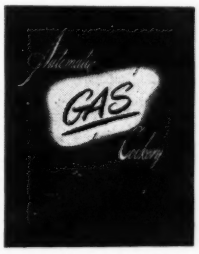
Train all home service personnel in sales slanting every conversation, every home call and every demonstration to prove that gas cooks better and costs less—and that today's gas ranges are modern and automatic.

Prepare recipe bulletins which accent the nine features most desired by women in new ranges for use on home calls and demonstrations; use campaign slanted recipes for bill enclosures.

List all available facilities for group contacts and schedule and give as many demonstrations of automatic gas cooking as possible.

Give parties for new users, preferably in their homes, to demonstrate new kitchen freedom made possible by automatic gas ranges.

6. Reach the Moulders of Young America's Thinking



EVERY home economics teacher should have a copy of a new booklet, "Automatic Gas Cookery." It is a practical teaching guide in selection and use of gas ranges. By equipping present and future teachers of home economics with such information, you will be taking a vital step in protecting your future market. The booklet will be welcomed by food and home management teachers, home demonstration agents and extension workers.

7. Tie in New Freedom Gas Kitchen Program

THE New Freedom Gas Kitchen forms a good background for the presentation of automatic gas cooking. A comprehensive plan of promotion ideas, advertising, displays and publicity is available for this purpose.

Here are a few ways to use these kitchens in promoting automatic gas cooking:

Install New Freedom Gas Kitchens on your display floor featuring automatic gas ranges. Persuade dealers to do the same.

Distribute kitchen sheets to holders of architect's reference manuals.

Display automatic gas ranges in New Freedom Gas Kitchens in demonstration homes. Do the same with home show displays.

Show "Flame of Freedom" color slide film.

Arrange school programs and meetings of civic associations, with kitchen planning theme as introduction to selling features of automatic gas ranges.

Arrange bank tie-in displays and distribution of materials featuring new kitchens with automatic gas ranges as subject for home loans.

Promotional material available to help tie in with the New Freedom Gas Kitchen program includes the following:

"New Freedom Gas Kitchens," a 24-page full color booklet; "Design and Blue Prints for Happier Living," a 12-page booklet of kitchen design ideas; "10 Step-Saving Kitchens for Modern Homes," another booklet; "Design Information Presentation Folder," an illustrated container folder complete with pockets to present a customer a set of recommendations in packaged form; architects' specification sheets, full of ideas, with adaptations for varying floor plans; decorating idea summaries—a sheaf of practical suggestions on color combinations, lighting, etc., punched and ready for addition to loose-leaf data files; advertising matches and notebooks; color slides and sound-slide films, to sell New Freedom Gas Kitchens unobtrusively at home institute and women's club meetings; kitchen design sheets including lists of needed equipment and practical appliance information.

8. Train Company and Dealer Salesmen to Sell Automatic Gas Ranges

GIVE company and dealer salesmen the very latest and best information available on cookery with "CP" ranges. For a quick, convenient, intensive sales course, use this short range sales training program:

1. Show them the film "Winning Seals of Approval." This film packs a selling job on modern gas ranges into 20 minutes that will make an indelible impression on salesmen's minds.

2. Follow up with home service classes demonstrating automatic gas ranges in actual operation. Teach salesmen modern cookery on "CP" ranges.

3. Conclude this short-range selling course with showings of "The Flame of Freedom," full-color slide film on New Freedom Gas Kitchens.

This three-step short-range program supplemented by personal talks by sales managers can do an effective sales training job in short time. For long-range training use a four-step program with plans and materials available from the AGA and appliance manufacturers. The four steps in this longer program are: 1. Salesman selection program. 2. Personnel training course in fundamentals of the gas industry. 3. Basic principles of residential gas salesmanship. 4. Product sales training materials from manufacturers.

9. Make Full Use of Envelope Stuffers, Inserts and Pick-Up Pieces

WRITE range manufacturers today for latest literature describing automatic gas ranges. Get as much of it as possible into circulation. Tell everybody, everywhere about the advantages of automatic ranges built to "CP" standards.

AGA CONVENTION CLEVELAND Oct. 6-8

The Public Square, Cleveland, off which is located the auditorium, site of the convention.

Industry Eyes Turn Toward Cleveland

THE rapidly moving research and promotional program which has been hitting the headlines the past few months will get special attention at the 29th annual convention of the American Gas Association, which will bring together thousands of the key members of America's most alert and progressive industry.

Delegates meeting at the Cleveland auditorium, Cleveland, Ohio, from Oct. 6-8 will attend sessions at which experts from within the industry, and individuals prominent in public life will review recent developments of importance, and forecast what part the industry will play in the world of 1948.

"Gas Has Got It" will be the theme of the convention, which is meeting at a time near the start of the greatest coordinated advertising promotional drive the industry ever has launched. It is through this drive, which unites for the first time all parts of the industry—utilities, manufacturers, and dealers—that the women of America are being told in unmistakable language that gas ranges have just the exact nine features they want.

Matters of broad importance to management will be covered at three morning general sessions. At sectional meetings operating problems will be covered in detail. Special programs arranged include those of the Natural Gas Department, the Technical Section, the Industrial and Commercial Gas Section, the Accounting Section, Residential Gas Section and Home Service Committee.

R. H. Hargrove, president of the American Gas Association, and recently elected president of the Texas Eastern Transmission Corp., operators of the Big and Little Inch pipe lines, will preside and deliver the presidential address at the opening session.

Considerable significance will attach to the speech at 10 a. m. the next morning (Oct. 7) by Nelson L. Smith, chairman of the Federal Power Commission, on the problem of gas utilty industry regulation. Mr. Smith's appearance and speech at the convention follows closely on the nationwide investigation, and at a time when the industry and business in general is uncertain as to what direction governmental control will take.

At the opening session, after an official welcome to Cleveland from Mayor Thomas A. Burke, the convention will get down to serious matters with a timely address by C. M. White, president, Republic Steel Corp., Cleveland. Mr. White will discuss the steel supply and its allocation, with special reference to the requirements of the gas industry.

A report of H. Carl Wolf, AGA managing director; an accounting of the association's financial position by Treasurer Edward F. Barrett, president, Long Island Lighting Co.; and election of officers for the next year will also be included in the initial session.

In honor of R. W. Gallagher, past chairman of the board of Standard Oil Co. (N.J.), Tuesday has been set aside as R. W. Gallagher Day. Mr. Gallagher, an AGA past president, and first chairman of the Laboratories' Managing Committee, has played a prominent part in the gas industry's progress over a period of years.

Tuesday morning at the second general session, the delegates will get the woman's viewpoint, when Dorothy Ellen Jones, supervisor of home economics of Cleveland public schools, delivers an address. She will discuss some of the problems of America's No. 1 customer.

The attitudes of stockholders and what they expect to find in the pages of annual reports will be the subject of another speaker who will point out some lessons learned in a nationwide survey of such reports.

The speech of Chairman Smith of the Federal Power Commission will come in the morning of the second day. Another government representative, Max W. Ball, director, Oil and Gas Division, Department of the In-

terior, Washington, D. C., is slated to address the Natural Gas Department meeting later in the day on "Fuels for Today and Tomorrow."

D. P. O'Keefe, president, Gas Appliance Manufacturers Association, will discuss trends and prospects in gas appliance developments, his subject being "The Responsibilities of Increased Production." Mr. O'Keefe will spotlight the material situation.

Rounding out this second session, awards will be presented for outstanding individual achievements. These include the AGA Distinguished Service Award (formerly the Charles A. Munroe Award), the AGA Meritorious Service Award, Gas Heating Progress Award, the Beal Medal, and the AGA Home Service Achievement Award.

J. J. Quinn, vice president, Boston Consolidated Gas Co., and chairman of the AGA National Advertising Copy Committee, will open the final general session, Wednesday morning, with the keynote speech "Gas Has Got It." Mr. Quinn will tell his audience of the features of the unprecedented promotional program, which will be carried out this year.

A word picture of the future will be drawn by a representative of the Pittsburgh Consolidation Coal Co., who will discuss the prospective rise of a brand new industry, based upon coal as a chemical raw material. This industry promises an exciting future for the problem-ridden coal industry as well as for the gas industry.

Frank H. Adams, president, Surface Combustion Corp. of Toledo, Ohio, will speak on industry-wide cooperation, with special sidelights on the house-heating situation.

From a leading banker, the convention will hear an analysis of the investment opportunities in the gas business, as viewed by the public generally. The speaker will take up what the average investor thinks of gas utility securities, and what can be done to maintain faith in the future.

Ernest R. Acker, president, Central Hudson Gas and Electric Corp., Poughkeepsie, N. Y., will discuss results to date of the comprehensive gas industry Promotion and Research Plan.

Sectional Meetings

A wide variety of informative and interesting material will be presented at the various departmental and sectional meetings which will provide a full program for the visiting delegates. Meetings have been arranged as follows: Monday afternoon, Oct. 6—Residential Gas Section, Technical Section, Motor Vehicle Committee and Accounting Section; Tuesday afternoon, Oct. 7—Natural Gas Department, Industrial and Commercial Gas Section, combined Manufactured Gas Department and Technical Section, and Accounting Section; Wednesday afternoon, Oct. 8—Accounting Section, Technical Section and Motor Vehicle Committee.

Under the sponsorship of the Home Service Committee, Mrs. Mary Belle Burnett, chairman, the popular Home Service Breakfast will be held again this year. It will take place Tuesday morning at the Hotel Hollenden and will include a special surprise program feature. At 2:00 p. m. that same day, a Home Service Roundtable will be held at the Hotel Statler.

The traditional President's Reception and Dance, with entertainment features, has been arranged for Monday night, Oct. 6.

The fall meeting of the Natural Gas Department at 2 p. m., Tuesday, Oct. 7, in the Euclid Ball Room of the Hotel Statler in Cleveland will be opened by Robert W. Hendee, chairman of the Natural Gas Department of the American Gas Association, and president of the Colorado Interstate Gas Co., Colorado Springs.

R. H. Hargrove, president of the American Gas Association, will give the report of the nominating committee as its chairman.

Dr. A. W. Gauger, of Penn State College, will discuss "Development of Standards for Testing Gaseous Fuels." Max W. Ball, Director Oil and Gas Division, United States Department of the Interior, will discuss "Fuels for Today and Tomorrow."

"The Present and Prospective Outlook for Steel Tubular Goods" will be the subject of W. F. McConnor, vice president, National Tube Co., Pittsburgh, Pa.

Natural Gas Meetings

Natural Gas Department Committee Meetings include those of the Managing and Advisory Committees, a dinner meeting Tuesday, Oct. 7, at 7:30 p. m. in the Rose Room of the Hotel Cleveland: the Nitrogen Removal Committee, Monday, Oct. 6, at 2 p. m., in parlor D, Hotel Statler; the Pipe Line Flow Subcommittee, Monday, Oct. 6, at 2 p. m., parlor M., Hotel Statler; and the Technical and Research Committee, luncheon meeting, Tuesday, Oct. 7, 12:30 p. m., parlor C., Hotel Statler.

A joint meeting of the Manufactured Gas Department and Technical Section will be held in the Little Theater auditorium at 2 p. m. Tuesday, Oct. 7. And there will be a further session of the Technical Section at the same place on Wednesday at 2 p. m.

THE PROGRAM

General Sessions

Monday Morning, Oct. 6

Opening Remarks
R. H. Hargrove, president

Mayor's Address of Welcome

Current Problems
C. M. White, president
Republic Steel Corp.

Election of Officers

President's Address

Managing Director's Report
H. Carl Wolf

Tuesday Morning

Public's Acceptance of Facts and Figures of Business Accounting
D. J. Hennessy
Jamaica (N.Y.) Water Co.

Reaching Young America
Dorothy Ellen Jones
Cleveland Public Schools

Presentation of Awards

Regulation of Gas Utilities
D. P. O'Keefe
President, GAMA

Wednesday Morning

Industry-Wide Cooperation
Frank H. Adams
Surface Combustion Corp.

Gas Has Got It
J. J. Quinn
Boston Consolidated Gas Co.

Gasification of Coal at Mines
Joseph Pursglove, Jr.
Pittsburgh Consolidation Coal Co.

Progressing Through Research and Promotion
E. R. Acker
Central Hudson Gas & Electric Corp.

Is Industrial Peace on the Horizon?
Ward Keener
B. F. Goodrich Co.

Report of Time and Place Committee on 1948 Convention

Report of Resolutions Committee

SCHEDULE OF EVENTS

Monday Morning
General Session

Monday Afternoon
Accounting Section Groups
Technical Section
Residential Gas Section

Monday Evening
President's Reception and Dance

Tuesday Morning
Home Service Breakfast
General Session
Industrial and Commercial Gas Luncheon

Tuesday Afternoon
Natural Gas Department
Accounting Section Groups
Home Service
Industrial and Commercial Gas
Joint Meeting, Manufactured Gas Dept. and Technical Section
Ladies Program

Wednesday Morning
General Session
Luncheon

Wednesday Afternoon
Technical Section

HUDSON W. REED
Philadelphia Gas Works

R. W. HENDEE
Colorado Interstate Gas

H. H. CUTHRELL
Brooklyn Union Gas

E. F. BARRETT
Long Island Lighting

A. F. BRIDGE
Southern Counties Gas

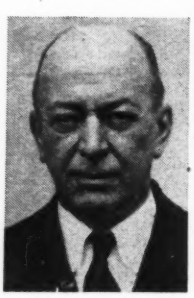
J. A. WILLIAMS
Niagara Hudson Power

LEON OURUSOFF
Washington Gas Light

R. G. BARNETT
Portland Gas & Coke

C. S. STACKPOLE
Consol. Gas, Baltimore

A. C. CHERRY
Cincinnati Gas



D. B. STOKES
U. S. Pipe & Foundry

C. E. BENNETT
Mfrs. Light & Heat

AGA BA

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☐ Hudson W. Reed

FOR FIRST VICE PRESIDENT

☐ Robert W. Hendee

FOR SECOND VICE PRESIDENT

☐ Hugh H. Cuthrell

FOR TREASURER

☐ Edward F. Barrett

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Laboratories Managing Committee

☐ J. A. Williams
Accounting Section

☐ Leon Ourusoff
Industrial, Commercial Section

☐ R. G. Barnett
Publicity Committee

☐ C. S. Stackpole
Residential Gas Section

☐ A. C. Cherry
Technical Section

☐ D. B. Stokes
Manufacturers Section

FOR SECTION VICE CHAIR

☐ C. E. Bennett
Laboratories Managing Comm

☐ L. E. Reynolds
Accounting Section

☐ B. T. Franck
Industrial, Commercial Secti

☐ W. M. Jacobs
Residential Gas Section

☐ S. J. Modzikowski
Technical Section

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- [ ] E. C. Boyer
- [ ] H. R. Cook, Jr.
- [ ] E. H. Eacker
- [ ] J. N. Greene
- [ ] D. A. Hulcy
- [ ] F. A. Lydecker
- [ ] J. S. Moulton
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- [ ] J. A. Robertshaw
- [ ] W. H. Rudolph
- [ ] L. B. Schiesz
- [ ] E. J. Tucker
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- [ ] C. H. Zachry

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Conn. Light & Power

B. T. FRANCK
Milwaukee Gas Light

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Southern Cal. Gas

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Cincinnati Gas & Electric

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Philadelphia Electric Co.

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Consol. Gas, Baltimore

E. H. EACKER
Boston Consol. Gas

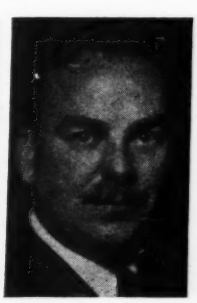
J. N. GREENE
Alabama Gas Co.

D. A. HULCY
Lone Star Gas Co.

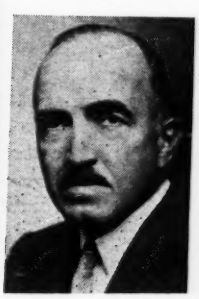
F. A. LYDECKER
Public Service, Newark

J. S. MOULTON
Pac. Gas & Electric

E. P. NOPPEL
Ebasco Services



J. A. ROBERTSHAW
Robertshaw Thermostat



W. H. RUDOLPH
Savory Equipment

L. B. SCHIESZ
Indiana Gas & Water

E. J. TUCKER
Consumers Gas, Toronto

H. K. WRENCH
Minneapolis Gas Light

C. H. ZACHRY
Southern Union Gas

Underground Storage

GAS is proud to present exclusively this powerful brief for underground storage as an answer to the problem of levelling off peaks and valleys in gas distribution. Mr. Fischer shows how, by literally bringing the gas field to the distributor's doorstep, long distance transmission troubles may be eased. A provocative point is made: underground storage need not be limited to depleted oil or gas fields.

By E. L. FISCHER

Engineer in Charge, The United Light and Railways Service Co., Davenport, Iowa

IT has long been recognized by natural gas engineers that the natural gas pipe lines biggest problem in attempting to supply the gas requirements of communities remote from the source of production has been the seasonally fluctuating demands of the markets. These fluctuations require large daily capacity lines and consequent investment charges, with part of the capacity utilized for only a few days each year. The term "load factor" as applied to pipe lines has, through long usage, come to be understood as the ratio between the total yearly deliveries of a pipe line and the possible yearly delivery if its full capacity were utilized every day in the year. It is often stated as the ratio of the average daily delivery to the maximum day's delivery, etc. Sometimes we distinguish between "load factor" and "capacity factor." The first ratio given may be said to be "capacity factor" and the second "load factor" if such distinction is desired. At any rate the capacity factor, or load factor as given in the first definition, has a very large influence in determining the cost of delivering gas over any existing pipe line.

Exclusive

These known facts naturally led to attempts on the part of every gas pipe line company to do everything that could be done to improve the load factor of the line and to utilize the otherwise idle capacity by the sale of interruptible and "off-peak" gas.

The so-called two-part rate, consisting of a "demand" charge of so much per month or per year per Mcf of maximum daily demand, and a "commodity" charge of so much per Mcf of total gas delivered during the billing period, was a natural development based on the facts as to costs of delivery of gas over pipe lines. For a number of years this rate has succeeded, where used with high demand charges and low commodity charges, in producing excellent load factors for the pipe lines. This has been accomplished by (1) making such a high rate for poor load-factor gas that the distributor's price for gas of this nature was not competitive with other fuels, and (2) the supplying of off-peak and interruptible gas at such low rates that the entire summer valley was filled.

The rising cost of other fuels and the lowering of pipe line rates, together with a realization by the public of the benefits of gas heat for homes, has now brought about such a nation-wide public demand for natural gas for house heating that practically every major long-distance pipe line is unable to meet the demand, and distributors have been forced to refuse to connect any new heating customers.

Need for More Capacity

THE major pipe lines are doing their best to increase their capacities by increased compressors, looping of lines, etc., but are unable to keep pace, primarily because of inability to procure pipe materials; but in any case it is becoming increasingly difficult even to predict what additional capacity is required if it could be provided.

Now this demand is primarily for gas of very poor load factor and the additional capacity which is provided will only increase the yearly sales by something like 25% to 35% of the added full yearly capacity provided, unless the summer valley is again filled with off-peak or interruptible sales. In addition to that fact any such new construction will cost much more than that completed during the past 15 to 20 years, which in turn makes the cost per unit of capacity provided, and consequently the cost per Mcf of demand, even greater than was required at the time of original construction.

To continue to hold down average delivered costs per Mcf by filling the line with off-peak and interruptible sales (if the required quantity can be sold at all) would require from two to three times as much yearly interruptible and off-peak gas as the yearly Mcf of house heating sales which

caused the additional capacity to be needed.

We may say then, to put it simply, that to sell an additional billion cu. ft. of heating gas we must provide 3 to 4 billion cu. ft. of additional gas reserves if we are to approach 100% use of our new facilities. If this is not done, the price at which pipe lines sell gas of the 25% to 35% load factor variety must be such as to carry the full investment in the additional facilities required to supply it, plus the purchase cost of the gas in the field and the operating expenses of delivering it. If this is done, then is the price so high that the house heating customer who is now clamoring for it will be unable to continue to use it after he gets it and if so, then what happens?

We are right back where we started 15 to 20 years ago, when the apparent decision of most long distance natural gas pipe lines was that they could only supply gas for heating to a limited extent on a luxury basis. The paradox, however, is that in the face of this *apparent* decision strenuous efforts were made to sell house heating gas and distributors were in many cases subsidized in their sales efforts by the pipe lines.

Our discussion so far is limited to the long distance lines. In communities close to production, house heating was taken in stride, and in many places practically universal house heating was supplied with little or no thought given to load factor; and yet these more or less local gas pipe lines found no trouble supplying the loads at a profit.

Many of these local fields were depleted to the point where they could no longer meet the requirements of the market connected to them, and their supply was augmented by gas from new and more distant fields, but fields which were still in the local area. Now, however, we are in the stage where entire local areas are reaching depletion and where, if natural gas service is to be continued to the communities supplied, reserves at great distances must be relied upon. In these cases a high load factor can be provided for these distant lines by building capacity for the base load only, the maximum demands being supplied from the local area by holding back production in light load periods and throwing it in on the heavy demand days. This, however, can last only for a limited period since the local areas will fall lower and ever lower in their production capacity.

The next step logically enough is to replenish in part the local areas during light loads so as to enable them to produce at high rates when the high demands occur; and that is the beginning of underground storage.

Before discussing the storage itself, however, let us return to the original long distance pipe line serving communities which never had natural gas previous to the construction of the long distance line. These communities have never had the same type of service, insofar as house heating gas is concerned, as was furnished to communities close to the source of supply, because of the very heavy investment burden required for poor load-factor gas at great distances from the production source. Now if gas for house heating purposes could be carried through the line every day of the year at a uniform rate instead of at high rates on maximum days and zero in the summer, it is clear that for the total yearly gas required the daily capacity of the line required would be only about one-fourth to one-third as great for any given volume of house heating sales.

If gas for heating purposes were to be delivered to the distributor at such a uniform daily rate it would have to be stored by each distributor. While most gas distributors do have storage holders of some type, the capacity is limited to a few hours use—at best, 24. It is of course not economically feasible to construct any type of storage that would provide sufficient volume to accomplish this seasonal storage.

We cited the condition facing most of the pipe lines now providing city gas services to distributors at long distances from the source of supply, and the fact that they have demands in excess of their capacity and are now obliged, if they are to supply those demands, to spend huge sums for new construction, which can only be utilized during a small portion of the year. In most cases, the facts are that the yearly capacity of existing lines would be adequate to supply the new firm gas demands for service if it were possible to convert present off-peak and interruptible sales to firm sales by the use of storage facilities at or near the market.

How Storage Can Help

THIS, then, is the simple case of what underground storage of natural gas can do for the natural gas industry and the consuming public, if underground storage exists or can be developed, at usable locations, of such size and production characteristics as will provide the pipe line needs. Now: what are those needs and what type of gas storage field may be found best suited to meet those needs?

We of course recognize that house heating gas is not the only type of load that must be considered in setting up our storage specifications if we expect substantially 100% load factor operation of a major pipe line. There is no

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During his long association with the gas industry, Mr. Fischer has conducted a number of studies that have been utilized to supply natural gas to most of Iowa and Nebraska. He has also had charge of designing and installing new natural gas distributing systems in a large number of smaller cities and villages in southeastern Nebraska, and has conducted negotiations for supplies of gas to many large cities in Illinois and Iowa.

Mr. Fischer has also been active in bringing natural gas to Detroit and other Michigan communities.

Graduated from Iowa State college in electrical engineering in 1912, he was general superintendent of the Fort Dodge Light and Power Co. within six years. He became general manager of the Muscatine Lighting Co. in Iowa and remained there with various organizations until he joined United Light and Power Engineering and Construction Co., Davenport, in 1924.

single class of customer, or—beyond that—very likely no single customer, who has use for gas in exactly the same quantities day after day during the entire year. Diversity as to time of use between classes of customer and between individual customers undoubtedly helps increase the load factor of the overall customer requirements. Load factors based on the maximum hour use need not be considered because the pipe line itself provides sufficient storage capacity to even out the hourly demands. In fact, the pipe line, taken as a whole, can in some measure even out the daily demand. This, however, is usually considered as something for emergency supply and should not be depended upon in capacity design. In general, however, practically all classes of sales that are not seasonal in character have demands fluctuating by days of the week or some other basis in which the time between maximum and minimum daily requirements is comparatively short. Storage for such loads therefore is in and out frequently and requires storage capacity of only a few days of use. It thus has little or no effect on the total volume of seasonal storage capacity required but does have a somewhat greater effect on the required ability of the storage to receive and deliver, in other words the required rate of production from storage.

TABLE I. YEARLY STORAGE CAPACITY AND MONTHLY MOVEMENT OF GAS INTO AND OUT OF STORAGE

In Percent of Total Yearly Heating Gas Sales

(Based on a large mid-western city's normal d.d.d. distribution by months)

Month	*Monthly Distribution of Degree Day Deficiency*	*Percent of Yearly Gas Requirements*	*Pipe Line Deliveries in % of Yearly Req.*	*Gas from Storage in % of Yearly Req.*	*Gas to Storage in % of Yearly Req.*
Jan.	1,219	19.39	8.49	10.90	
Feb.	1,084	17.25	7.67	9.58	
March	871	13.85	8.49	5.36	
April	536	8.53	8.22	.31	
May	260	4.13	8.49		4.36
June	67	1.06	8.22		7.16
July	7	.11	8.50		8.39
Aug.	8	.12	8.49		8.37
Sept.	84	1.34	8.23		6.89
Oct.	334	5.31	8.49		3.18
Nov.	709	11.28	8.22	3.06	
Dec.	1,108	17.63	8.49	9.14	
Totals	6,287	100.00	100.00	38.35	38.35

To illustrate our point, suppose we have a pipe line which supplies no heating gas and has no other seasonal requirements: It supplies primarily domestic, commercial and firm industrial load. Such load, from the experience of most gas companies is found to have a load factor of somewhere in the order of 70% to 80%. For illustration let us say 75%. At a 75% load factor the average day of the year is 75% of the maximum day. Therefore, on the maximum day only 25% of the load need be supplied from storage. The maximum daily production rate required from storage would, in this case, be 25% of the daily pipe line capacity. It is probable that the minimum daily requirement might be about the same percentage under the average, which would mean that the maximum rate of input to storage would be the same as the maximum output rate required.

Now, as to the volume capacity of storage required. The only way this could be accurately determined would be from a daily load curve. The result would be obtained by determining from this load curve the maximum net output from storage over the largest period found from the load curve until the input and output from storage again were in balance. It would in all probability be found that the equivalent of a week of maximum daily withdrawals from storage capacity would be more than ample. On this basis the required storage capacity for this purpose would be 7 times 25% of the maximum day requirement. To illustrate, suppose the maximum day requirement was 100 MMcf. The average would then be 75 MMcf and the maximum daily withdrawal rate 25 million. The volume storage capacity would then be 7 times 25 MMcf or 175 MMcf, a right sizable chunk of storage based on either gas holders or pressure storage holders—but insignificant when applied to underground facilities.

The seasonal loads (and for simplicity we will assume these are all space heating loads) are, however, something quite different. In the first place, for such loads the minimum daily requirement is zero and (based on 25% load factor) the maximum daily requirement is four times the average (based on the full year) daily requirement. On this basis it is immediately clear that the daily production capacity required from storage, for 100% pipe line load factor, will be three times the pipe line capacity devoted to this class of business. It is also clear that the maximum rate of input to storage is 1/365th of the total yearly house heating sales. There is then no need of complicated calculations to determine the required maximum rate of production from storage.

The next question, what yearly available storage capacity is required, is also comparatively simple. All one needs to know for fairly accurate determination is the normal degree day deficiency, by months, of the area to be served. It may be that for best accuracy several sets of calculations by zones should be made. We will confine our discussion and illustration to a single calculation. For illustration we show in Col. 1 of the table the normal degree day deficiency of a large middle west city by months, as given in Heating and Ventilating Guide for 1946 (published by American Society of Heating and Ventilating Engineers). Col. 2 shows the percentage of yearly d.d.d. for each month, which we may call percentage of total yearly heating gas requirements for each month. Col. 3 is the percentage of yearly heating gas deliveries from the pipe line, assuming the same volume is handled every one of the 365 days (100% load factor). Cols. 4 and 5 are respectively the percentages of total yearly heating sales required from storage and delivered to storage by months. Since the months from November to and including April all require net output from storage, the sum of the percentages for those months represents percentage of total yearly heating gas for which storage must be provided in a normal year. For this specific case, as appears, it is 38.35% of the yearly heating requirements.

Such calculations made from normal degree day deficiencies will give the normal storage capacity. Allowance must be made over such figures for abnormally high d.d.d. years.

If long-time weather data is available by years, the same calculation could be made for the coldest year (or heating season) of record by zones, and could be used instead of the so-called normal year.

Since, however, for a growing load it will always be necessary to provide both pipe line and storage capacity in advance of load development such provision may be sufficient to handle the abnormal season.

It may thus be determined for any given pipe line what seasonal storage

capacity is required and what maximum rate of production is required.

The next question is, can such a storage field be procured. It will be the exception rather than the rule if storage field or fields to fit the exact desired specification are at hand. We may well find that it will be necessary to accept a field that is too large in seasonal capacity in order to provide the required production rate, or that a large field is the only one available. On the other hand small fields of high permeability may provide the required production capacity but not have sufficient seasonal capacity between the usable maximum and minimum pressures. These things may influence the cost of securing and developing the fields for storage and the operating costs of the field when secured, but unless they are way beyond all reason they will still be far cheaper than the cost of an additional pipe line with equal maximum day capacity.

In general we believe any geological structure in the earth which has been proved capable of holding gas or oil until discovered (probably millions of years) by the drill is capable of holding gas at least up to the original discovery pressure of the gas or oil field unless the drilling and development of the field after discovery has been so improperly handled that the drilling defects cannot be remedied. It would seem advisable then, in seeking a storage field, to look first to depleted or partially depleted gas fields and, if none are available, to look to depleted or partially depleted oil fields.

If no gas or oil fields exist in a location usable by a given pipe line are we to conclude the pipe line is just out of luck and must continue supplying peak load capacity all the way from its original source of supply?

I am undoubtedly sticking out a bold neck but would like to offer a suggestion which may offer a glimmer of hope for any such pipe line.

Not all structures capable of holding gas are found to contain either gas or oil, probably because no source beds for the formation of oil or gas were placed by nature sufficiently close to such structures to enable the resulting oil or gas to find its way into them. Is it not therefore logical to expect that if such structures can be located and gas injected into them that they might well be developed into a storage field?

Types of Fields

ESSENTIALLY the storage field may be considered simply a very large volume high pressure storage tank. If it were possible to build a high pressure storage tank, or a group of tanks, capable of receiving and delivering, within its permissible maximum pressure and some economically usable minimum pressure, the seasonal volume required, we can see at once that there would be no problem of maximum withdrawal or input rate, since it would then be simply a matter of the size and number of openings provided in the tank or tanks. Therefore, it follows that the best storage field would be a large cave or series of caves deep in the earth and completely sealed by impervious rock structures capable of holding gas at high pressures. To this cave would be drilled wells of such size and number as were required to provide the desired maximum withdrawal rate; or, if physically feasible, a single large casing well would do the trick.

Unfortunately nature has not, to the best of our knowledge, provided any such ideal conditions. The next best field, many of which do exist, is the case of a porous rock structure embedded in and completely surrounded by impervious rock structures. Such formations are generally known as lenses.

These lenses are in effect large high pressure tanks filled with sand, gravel or other substance, providing voids between the particles; and the results from such fields when used as a storage for gas are completely analogous to the results from tanks filled as above.

In the first place, the volumetric capacity of the tanks is reduced to that of the void spaces instead of the whole volume of the tank. If the tank were filled with marbles or large gravel the void space would be very high. If they were filled with fine material such as sand it would be much less; with pulverized material, especially if saturated with moisture, it might form a practically homogenous voidless mass with the void space approximately zero.

In the second place there would be resistance to the free movement of gas within the tank, thus restricting the rate at which gas could be injected or removed through a given sized nozzle in the tank and therefore requiring that many more nozzles be placed in the tank to accomplish the desired injection or withdrawal rate.

If the material placed in the tank were, for instance, marbles all of a given diameter and shape, the void space and the resistance to free movement would bear a direct relation to each other but if gravel of varying size and shape is used throughout the tank, then parts of the tank would have more void space than other parts and the resistance to flow, relative to void space, would not be uniform. Void space is usually referred to as "porosity" and the reciprocal of resistance to free flow (in other words, ability to pass gas through the material) is referred to as "permeability."

Porosity as such is only a measure of the capacity to store gas within a structure of a given volume. Permeability is a measure of the rate at which gas can be injected or withdrawn from a given nozzle in our hypothetical tank, or from a given well in the storage field.

Thus, in a truly lenticular structure having sufficient area and porosity to store the required seasonal volume of gas between the maximum and minimum pressures used or usable, the number of wells required to be drilled for a required maximum output rate is determined by the permeability of the structure throughout its area. The drilling of more wells makes a larger portion of the stored gas immediately available at the sand face, and at the same time maintains a more uniform pressure throughout the field area, thus providing the greater rate of withdrawal required.

Working pressure ranges in a truly lenticular field, as in the analogy of the storage tank, may be, as a top limit, a reasonably safe factor under the rupturing pressure of the containing walls, and as a bottom limit, atmospheric pressure. The actual working pressure range will be determined in most cases by economic considerations.

A gas or oil field in a continuous porous geological deposit or stratification can exist only where a so-called closure has been effected by earth movements, either in the form of a dome with all edges of the stratification sealed by liquid, or one having an upper edge closed by a fault with liquid seal on the lower edge. In such a field, practically dry gas may exist in the upper part of the closure, with oil or water in contact with the gas at lower elevations and, if oil is present, the lower edge of the oil in contact with water. In the case of dry gas in the dome in contact at the lower edge with water, the gas pressure and water pressure at the line of contact were, before any gas was removed, equal, and that pressure would be the so-called rock pressure of the gas. The porous strata may or may not, at some point on the earth, be exposed to the atmosphere or to the bottom of the sea. If such exposure exists, then the pressure will correspond to the static head of the water from the point of exposure to the depth beneath this level at which the gas and water are in contact, provided there is no movement of water through the strata.

Assuming the conditions of gas and water in contact and the porous strata exposed to the surface, the pressure at initial discovery was the static head only if the whole water and gas body were static, that is, having no movement. Any movement of the water through the porous and permeable rock strata would require a differential pressure to cause such movement and thus destroy the static head.

Assuming further such a field at discovery to have a pressure equal to the static head, let us see what happens after discovery and withdrawal of gas.

Obviously, upon penetration of the drill into the porous structure, the gas pressure at this point, assuming the well bore open to atmosphere, will drop approximately to atmospheric pressure, and a steep differential pressure will be established between the well bore and the main rock structure. This will cause gas to flow toward the well bore at a rate depending upon the initial rock pressure and the permeability of the structure. If the well has been allowed to flow only a short time and is then capped, the well bore pressure will quickly equalize approximately to that of the original rock pressure. As more wells are drilled and production from the field started, the whole gas area will be reduced in pressure, the rate of reduction being determined by (1) the ratio of withdrawal to the total original gas content of the closure, and (2) by the well spacing and the permeability of the strata. As the pressure is lowered, the underlying water will start moving into the lower pressure area and occupy some of the space originally occupied by gas. A pressure differential will start in the water, and the entire balance of pressures will be destroyed. In all probability, water will move much more slowly into the gas sand than the gas will move out, but it will always move to the lowest pressure areas near the wells and eventually will reach the wells, filling the bore and preventing further withdrawal of gas.

If, however, when this happens, the entire field were capped in and left so for a sufficiently long time (it could be many, many years) a static condition would again prevail and the gas pressure would again reach the original rock pressure. At this stage a volume of water equal to the volume of gas withdrawn (at the original rock pressure) would have moved into the space originally occupied by gas.

If we were to inject into such a field a volume of gas equal to the volume initially withdrawn, the first effect would be to create a higher pressure than originally existed. If after this we again closed in the field and let it stand we would find the pressure gradually declining from year to year, and if it was again left long enough we would probably find that the original rock pressure again existed.

Now, if we assume that such a field was produced until all of its wells were drowned out by water, and further assume that every well was properly plugged and abandoned as it became useless, we would probably find that after a reasonable period a new well drilled at or near the top of the closure would again produce gas.

Such a field could certainly be used as a storage field and in all probability, if properly handled and the average yearly pressures maintained at or somewhat above the original rock pressure, its total gas content could again be restored to the original volume. If, however, average pressures above the original rock pressure were maintained for too many years, some gas would be lost through the water seal.

Such a field would make an excellent storage field, but would be subject to more limited operating pressure ranges, and close attention would have to be given to safe withdrawal rates from the various operating wells to avoid water coning.

If the field were not completely depleted before being put to storage use, it would become an effective storage field at once.

If the field were completely depleted and some or all of the original wells left open as they became useless, it could still be made into a good storage field provided casings had not been removed. If, however, casings had been pulled and the holes not plugged at the impervious rock cap, it would probably be beyond recovery, since these holes in the cap rock could not be plugged and gas would find its way through them to surface or higher porous structures and be forever lost.

Economic Considerations

A field which is too large in gas content as initially discovered is apt to be rather costly, since to repressure it to a good operating condition will require possibly several years of putting in with no withdrawals, and the amount of capitalized gas would be very expensive.

A field of very low permeability, even though it be not too large, would be much more expensive to develop and operate because of the large number and close spacing of the wells which would be required to produce the desired capacity.

Fields which were originally developed without much care in the casing and cementing will be hazardous, since a great deal of gas can be lost through poor casing jobs. If, however, all of the original wells are still open, it is probable these could be made safe.

The use of an abandoned oil field for gas storage, while physically feasible if no wells have been abandoned or casings pulled without plugging, would probably be found rather expensive unless all wells had initially been carefully drilled and cased; and it is probable more carelessness would be found than in the case of a gas field, especially if the oil were found originally at rather low pressures and was put on the pump early in its life.

Creating a Field

AS previously mentioned, not all places in the earth capable of holding oil or gas under pressure are found to contain either of them. Consider a closure with water through the entire porous structure. This condition is exactly similar, except for possible remaining pockets of gas at the top of the closure, to the case of the depleted field with water drive, which we assumed had been carefully plugged as each well was abandoned.

If such a structure were found and a well drilled in the very top of the closure, water would raise in the well to a point corresponding to its pressure head. The injection of gas at some pressure in excess of the static head of water, creating a differential pressure in the water immediately around the well, would force the water away from the well. Continued injection would gradually create a gas cap on top of the water. Such gas could be removed within a relatively short time after injection, but it would be best never to allow the well base pressure to fall below the static pressure of the water. If the well did not find the exact top of the closure, it is probable the water would again immediately drown out the well upon reduction of the gas pressure below the original water head. The gas would naturally seek the higher level and be found in the top of the structure. If the structure is a true closure, however, and gas pressure in excess of the water pressure is continually maintained, the gas will gradually force the water away from the closure and make room for itself. As the water is forced away from it the gas area will expand.

It should be entirely feasible to produce a storage field in this way. However, one would want to be very sure one's geologist had indeed found a closure, and it would seem best to spend enough on wells to prove it before gas injection was begun.

Radio at the Wellhead

Gas-gathering operations at United Gas Pipe Line Co. fields are expedited by the use of 2-way radiotelephone service areas which also excell in times of emergency. The system has proved to be a time-saver.

By FRED E. EBEL

DEPENDABLE natural gas service doesn't "just happen," states a United Gas Pipe Line Co. report, referring to the numerous and varied labors attendant to the purchase, gathering, transmission, and sale of natural gas.

Exclusive

The varied activity suggested in the epigrammatic statement is illustrated most effectively by the 2-way FM Motorola radiotelephone communication system operated by the United Gas Pipe Line Co.

Here, in the vicinity of any one of the 77 Motorola mobile units, the listener will hear an almost incessant flow of traffic—orders to meter-and-well attendants, compressor station demands, instructions to repair crews. And, in times of emergency brought on by floods, tornadoes, or other catastrophes—urgent calls for men, supplies, and medical aid.

The impression formed by the listener of such intensive radio activity does not include the phrase "just happen."

Two-way FM radiotelephone excels all other means of communication in effecting split-second coordination of pipe line operations. Gas gathering operations, for example, at the great Carthage field in east Texas would be seriously hampered were it not for the speedy communication afforded by 2-way radiotelephone.

The dispatchers at Carthage give radio much credit for the success of operating the new 24-in. line which originates at Carthage, Texas, and terminates at Monroe, La.

Radio vs. Winter Cold

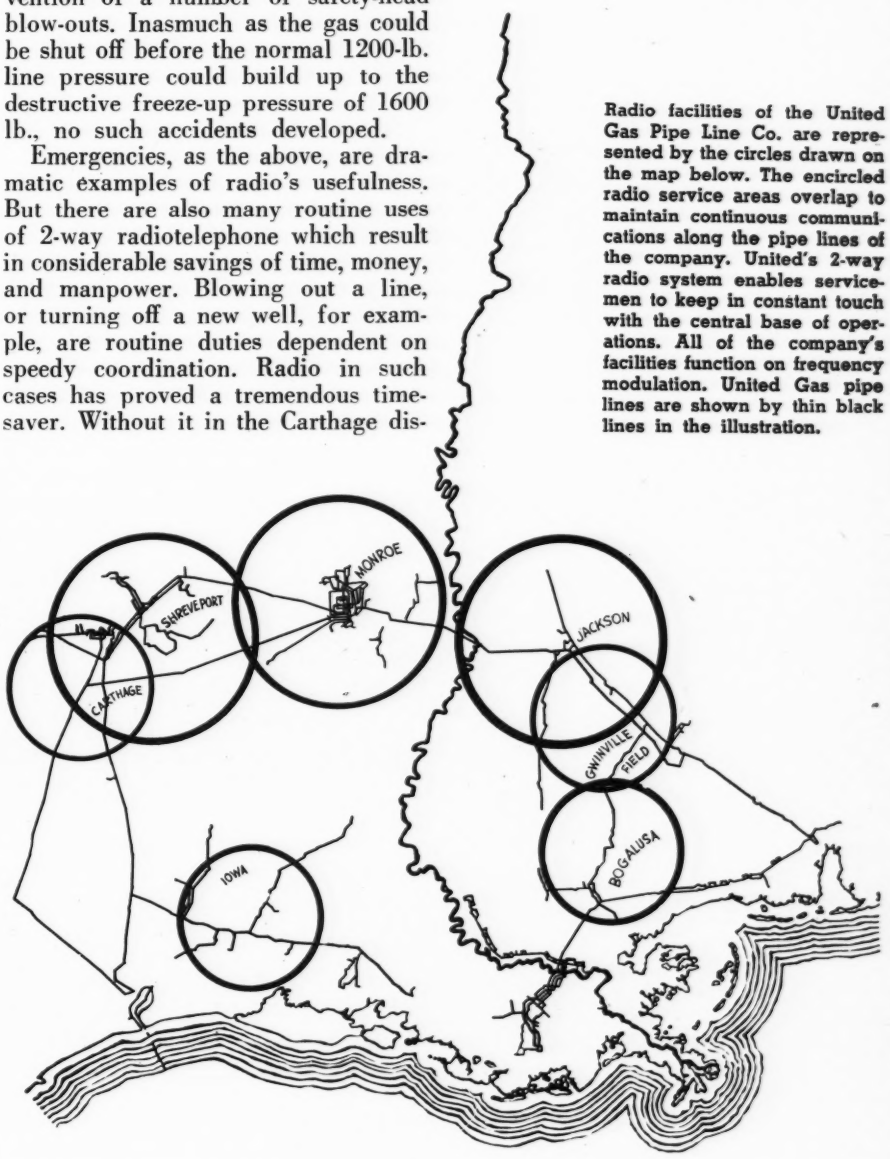
The job of delivering 110 MMcf of gas from 125 gas wells is no small task. Winter-time freeze-ups caused by hydrates can "block" a series of wells in a few minutes. Not long ago an entire section of wells froze up in 10 minutes, cutting off one-half the total gas load. By means of 2-way radiotelephone, however, this lost volume of gas was replaced on the other side of the field within only one hour.

Without radio, someone at the office would have had to round up the necessary crew of men, a job that would have taken at least an hour. Getting to the wells and performing the job would have taken two more hours, making a total time loss of three hours.

Instant communication to the field men was also instrumental in the prevention of a number of safety-head blow-outs. Inasmuch as the gas could be shut off before the normal 1200-lb. line pressure could build up to the destructive freeze-up pressure of 1600 lb., no such accidents developed.

Emergencies, as the above, are dramatic examples of radio's usefulness. But there are also many routine uses of 2-way radiotelephone which result in considerable savings of time, money, and manpower. Blowing out a line, or turning off a new well, for example, are routine duties dependent on speedy coordination. Radio in such cases has proved a tremendous time-saver. Without it in the Carthage district, where lateral lines branch out 16 miles and no telephones are available, it would be necessary for a man to drive those 16 miles to determine what to do before he could go to work.

However, with 2-way radiotelephone, the field man simply leaves open the door or window of his car, hears the message, even though he is some dis-



Radio facilities of the United Gas Pipe Line Co. are represented by the circles drawn on the map below. The encircled radio service areas overlap to maintain continuous communications along the pipe lines of the company. United's 2-way radio system enables servicemen to keep in constant touch with the central base of operations. All of the company's facilities function on frequency modulation. United Gas pipe lines are shown by thin black lines in the illustration.

tance from the vehicle. This ready access to a speedy form of communication instills a feeling of confidence in the men, according to J. Q. Vardaman, pipe line superintendent.

"A man will do a job he wouldn't attempt otherwise because he knows that if something happens he can be set right immediately by radioing his superior," says Vardaman. "The men," he adds, "would feel lost without radio."

Simple Operation

Operation of the 77 Motorola 2-way radiotelephone mobile units is simplicity itself. To transmit, the user pushes a button top of a palm-size military microphone, and then speaks in a normal tone of voice. No shouting is necessary because the equipment incorporates a powerful speech amplifier. To receive, the operator simply releases the button and listens to the voice of the dispatcher or other mobile unit operator, emanating from a concealed loudspeaker.

A small control head conveniently placed below the instrument board is all that is visible to the operator's eyes—the actual transmitter-receiver units being placed wherever convenient. The usual location on passenger cars is the luggage compartment, while on trucks it is often convenient to have the equipment installed in a metal container, either behind the cab or on a side of the vehicle.

A roof-top antenna, designed to give uniform transmission in all directions, is also used for reception. A spring base permits deflection of the hollow whip when driving under low places. If desired, the antenna may be fastened down horizontally without impairing transmission or reception over short distances.

The mobile units can "talk back" to the main station within a radius of 50 miles. From then on reliable transmission depends greatly upon the surrounding terrain.

Surmounting Heights

Height, for example, presented by a hill or a mountain, exerts a powerful effect on increasing transmitter range. Sometimes a radio-equipped car far beyond its service range will, upon reaching the crest of some high elevation, be heard by the main station. Distances exceeding 100 miles have been "covered" by mobile units in some mountainous areas.

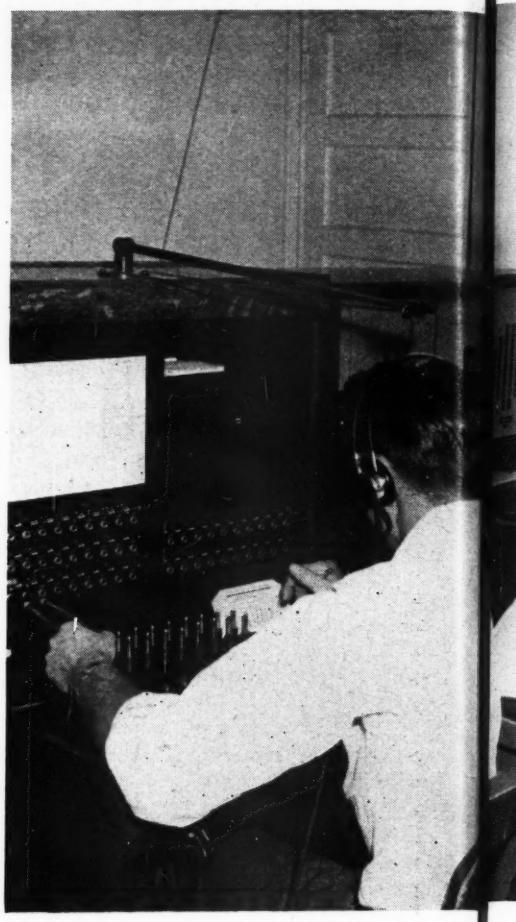
Car-to-car operation is reliable up to 20 miles. Here, too, however, terrain is influential in increasing the range. Mobile unit operators are aware of the effect of height, and will often radio: "Try me again when you reach a hill."

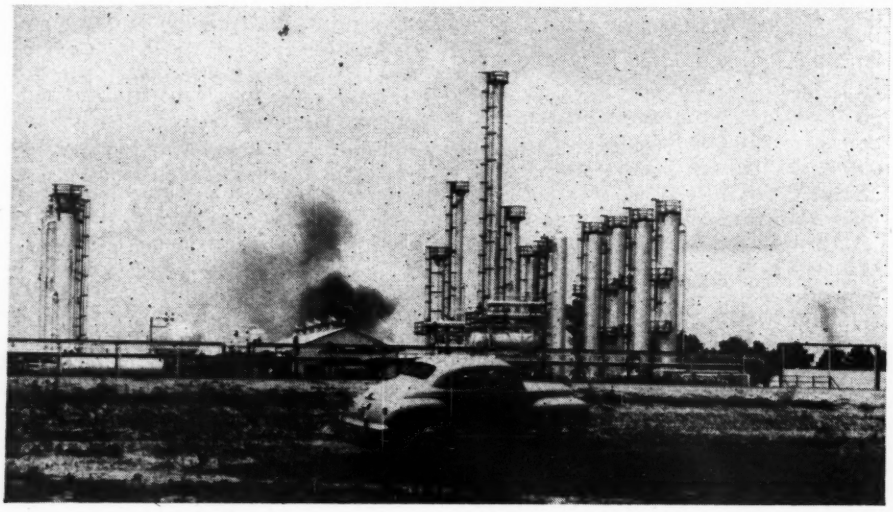
Station sites not favored by naturally high terrain usually compensate for this condition through the expedient of tall antenna towers. Station KUHA at Sterlington, for example, utilizes a 300-ft. tower. Tall towers are also located at KUHD, Shreveport; KHRS, Iowa; and KUHC, Carthage.

All of the main stations employ Motorola FM transmitters and operate on the very high frequency of 31,180 kc, far beyond the range of commercial broadcast equipment.

The mobile units operate on the frequency of 31,020 kc. By pushing a small switch to the left on the control head, car-to-car communication can be established, thus actually making it a 3-way radio system.

The fact that a worker can be contacted while driving enhances vastly the usefulness of the radiotelephone system. Recently, for example, a well-heater developed trouble. The dispatcher knew it would be noon before a man would make a routine check on this heater. He, therefore, immediately contacted the man by radio, and because the worker was only a short distance from the heater (yet unaware of its condition), an expensive piece of equipment was saved from damage.





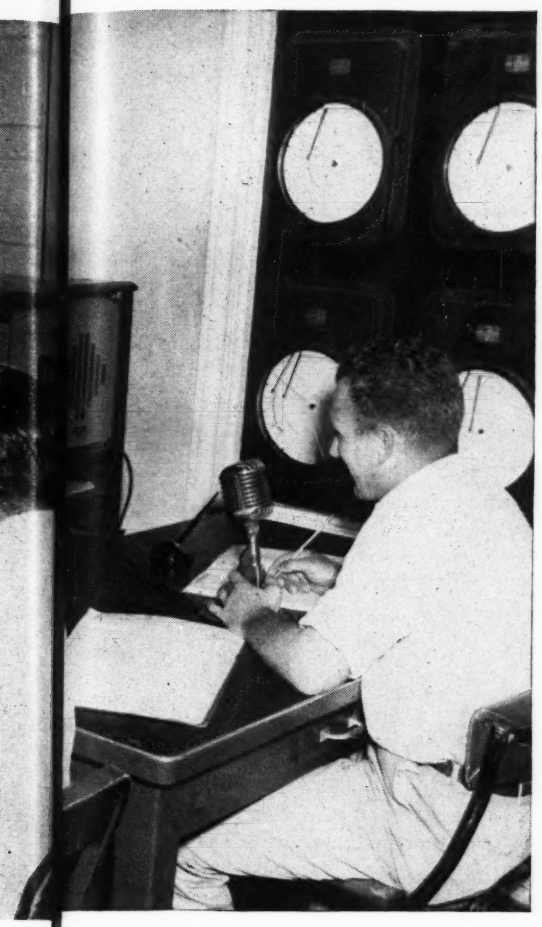
United's gasoline plant at Carthage, East Texas. Two-way FM Motorola radio-equipped supervisor's car in foreground permits instant contact with field men. The radiotelephone system has proved to be of outstanding value in preventing freeze-up by gas hydrates.

Without radio communication, under scheduled routine check, this well could have been put out of operation for several hours, and it would have been necessary to dispatch a maintenance crew to the well in order to place it back into service.

Here was a single incident where quick action made possible by 2-way radiotelephone paid for a number of radio mobile units.

Eliminates Backtracking

Backtracking, where a routine checkup man has to go back to where he's come from, has been completely eliminated by radio. A meter-and-well attendant can be informed immediately of a changing load condition. Before radio was used, a man could not leave a well without risking development of a trouble demanding immediate attention during the few minutes



Dispatching headquarters KUHC at Carthage. Radio dispatcher can contact immediately any of the 2-way FM Motorola mobile units in the 125-well area.

of his absence.

Obviously the fact that a man doesn't have to backtrack not only eliminates dead mileage, but also exerts a powerful effect on the worker's morale. It is only human nature for a man to find it annoying to have to return to a place he has just come from in order to check for trouble.

Another psychological advantage afforded by radio lies in the fact that a worker can summon help in case of an accident. In desolate areas, for example, it is comforting to know that help can be obtained by simply pressing a button on a microphone.

Public Benefits, Too

Not long ago a truck was mired in the middle of a ditch. The driver radioed for help, and within a few minutes a truck arrived to pull him out. Still another time, a worker's car was out of service due to a defective battery. But because there still was enough current in the battery to operate the transmitter, the man was able to signal for help, which arrived shortly after his call.

Use of the radio system is not confined to company operations. The public benefits, too. A short time ago a United Gas worker saw a car overturned in a ditch. He radioed the location and nature of the accident to the dispatcher. The latter dispatched an ambulance, which arrived before the people were removed from the wrecked car!

Incidents as the above, plus the hundreds of radio successes in the field, have placed 2-way radiotelephone in the "must" category of efficient pipe line operations. Already plans for expansion of the communication network are under way. Recently completed is a 15-watt FM Motorola repeater station, strategically located between Shreveport and Sterlington.

This station, which is unmanned, being "turned on" by the radio waves themselves, functions as a booster station in the so-called "fringe area" where another boost is advantageous in getting the signal through.

Frequency Modulation Used

It will be noted that FM, or frequency modulation, is employed throughout the system. This ultra-modern technical feature answers a long-felt need for static-less reception. Even the severest of lightning storms does not affect FM reception. Miniature "lightning," too, in the form of sparks thrown from ignition systems and motors, is greatly minimized by this latest method of modulation.

FM also permits a high degree of speech fidelity. Overtones of speech are faithfully reproduced, and it is not unusual for a listener to identify an acquaintance's voice from speech characteristics.

The radio communication system is under the supervision of Richard C. Appling, superintendent, dispatching. Radio technician William H. Craig, who holds a radiotelephone second class license, is in charge of maintenance. Except for periodic frequency checks, very little maintenance work is required. To rugged construction, incorporating techniques developed during the war, is credited this trouble-free operation.

Many Boosters

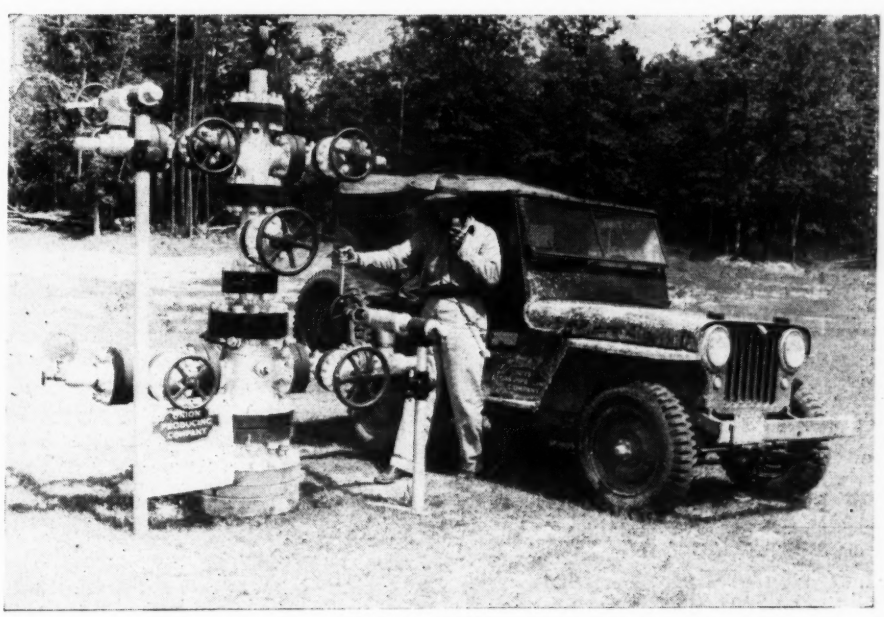
This dependable operation has added fuel to an already glowing enthusiasm. Typical of the boosters of the radio system is Superintendent Vardaman, who says: "We no longer have to blow a line an extra length of time and waste gas. Two-way radiotelephone has cut down our shutdown time five hours!"

A vast amount of responsibility goes with the transmission of natural gas to its ultimate consumer, the public. Hospitals, schools, public institutions, and the mass volume of users of industry—all depend on an uninterrupted supply of natural gas.

United Gas Pipe Line Co. employees are proud of having met this obligation in every respect.

"We feel," says Mr. Appling, "that the 2-way FM Motorola radiotelephone system is a powerful agent in helping maintain dependable natural gas service."

Operator of 2-way FM Motorola radio-equipped jeep can contact dispatcher at the press of the military-type microphone he is holding here. The field man's calls are relayed through the nerve center of United radiotelephone system pictured in action above.



The Use of TECHNOLOGY

In Customer Service Administration

By C. A. RENZ
Mgr., Customer Service Dept.
Southern Calif. Gas Co.

Technology offers solutions to the growing problem of meeting customers' demands without permitting costs to get out of hand. Presented here are Parts 1 and 2 of a three-part paper. Part 3, titled "Quality Control," will appear in the November issue.

Part 1.

Modern service to gas customers is far more complex than it was just a few years ago when simple burner adjustments assured satisfactory performance of the appliance.

The upward prewar trend of requests for service was so gradual that the demands were met in easy steps, making the increase of service requests less apparent. As appliances met competition between fuels, added responsibilities were assumed by utility service organizations. The war decreased the work load of most service departments and, to all appearances, suspended the normal development that would have occurred during the war years. Even in this period, however, the factors responsible for our prewar growth continued active, as modern appliances and accessories were being developed. The wartime public looked forward to new appliances with added automatic features. Most of those dreams have not materialized, but the recent increase in customer requests for service, during the normally off-peak summer season, is indicative of what can be expected when our national economy is sufficiently stable for the American public to have their new gas equipment.

Meeting the demands of an unprecedented number of customers with more modern equipment will offer a challenge to gas utilities if costs and customer demands are to be kept in a balance consistent with the competitive market. The job will be less difficult if utilities will develop and make full use of the technological tools available.

This paper highlights the methods of meeting these problems as developed in the three major staff sections of the Customer Service Department of the Southern California Gas Co. The first section includes "Order Forms and Order Analysis, Production Control and Methods Improvement;" the second section deals with "Employee Training," and section three treats the activities of the "Quality Control" group, which measures the effectiveness of line and staff efforts.

Order Forms and Order Analysis

WITHOUT going into detail, we find that certain aspects of our order form design and its use are of interest.[1] While the need for obtaining complete work reports of operations performed by individual servicemen is recognized, it is important to keep clerical time to a minimum, both from the standpoint of the initial recording and the later processing of such reports. The clerical time of our field personnel is kept to a minimum through the use of a single basic form, which can be used by the serviceman to record all work performed on the call. Field-discovered changes in occupancy and meter or regulator changes are reported by the serviceman on the original order. This simplified procedure has definitely proved advantageous when compared to earlier routines, which required issuance of several types of orders to complete a given assignment. An arrangement of check squares on the back of the order both reduces the time required in reporting appliance work and allows the data to be summarized through the use of mechanical equipment, such as are furnished by International Business Machines.

Service work and conditions encountered in the field vary so widely that it is essential to establish patterns or trends rather than attempt to deal with individual orders in matters of policy and costs.

All completed orders, system-wide, are processed through a centralized "Summarization Section." This section reviews the orders for completeness, checks time sheets, etc., and prepares an I.B.M. card for each field call made. *Fig. 1* shows the I.B.M. key punching and sorting machines of this section.

Through the use of I.B.M. mechanical equipment, these cards are sorted, the listings of all calls are made, the sales survey file is kept up to date, and order counts and statistical studies are prepared. One interesting feature of this section's work involves the prorating of servicemen's field time to the required Public Utilities Commission accounts.

At one time this information was accumulated from individual servicemen's time sheets containing detailed breakdowns of each man's daily activities. Through use of the data supplied to the Summarization Section, the field time segregation is now prepared monthly on the basis of order counts and standard order time values. The change made it possible to simplify the clerical routines involved in the preparation of the daily time sheets and at the same time increased the accuracy of the data.

Two Million Orders

In a "normal" year, this section will handle close to 2 million separate field orders. Processing this volume of field assignments, together with match-up orders, sales survey cards, etc., requires the handling of a total of approximately 7 million pieces of paper yearly by the order summary section. This section, which provides production control, error data, etc., in regard to field service work, is itself under a production control technique that, without undue cost, keeps clerical errors that would affect bookkeeping

[1] Only summarized in this presentation. For a complete story on employee training at Southern California Gas Co., see "New Trends and Developments in Training of Employees," by C. C. Westmoreland, GAS, Aug. 1946.

[1] Details of order classification and work reporting contained in "Analysis of Time Requirements for Customer Service Field Work" by G. H. Pickett, 1946 Proceedings of Pacific Coast Gas Association, Vol. 37.

Presented at PCGA Convention, Sept. 25.

Fig. 1. Summarization section, which processes all completed orders, typifies the use of technology in directing the administration of service to the customer.

and other departments to such a low point as to be negligible. Spot check records are kept on each key punch operator's work, indicating both the quantity of work produced and the per cent of error. While a 100% auditing or use of "verifying" punches is not warranted, some remarkably low error frequency results have been obtained by proper supervisory use of these spot check records. For example, an error frequency of .03% was achieved by one operator, and the department as a whole averages .05%.

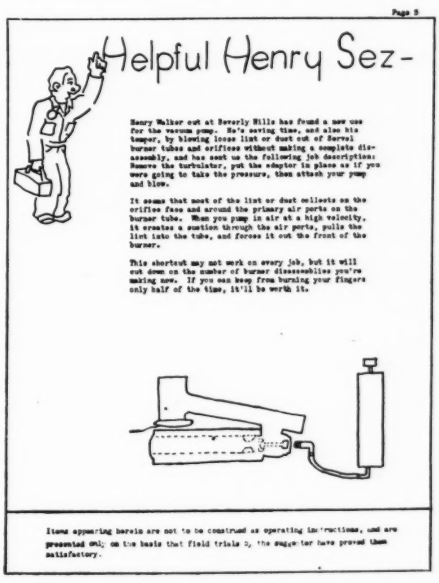
Production Control, Methods Improvement

CUSTOMER service field work is essentially an individualized occupation, very similar in some ways to the job of a door-to-door salesman. Such a salesman encounters the same range of human contacts or problems, but his "line" is much more restricted. The results obtained by a door-to-door salesman handling a given product or group of articles are rather concrete, consisting primarily of cash or signed orders. Customer service work involves the wide variety of appliances installed on our lines and goes much deeper into the problem of achieving customer satisfaction than merely eliminating repeat calls or further complaints.

Production control and methods improvement are both more difficult and offer more opportunity in customer service work than in factory or office work. In the latter case, the foreman or supervisor is constantly available to control the methods used and the results obtained. He can also judge by visual inspection the reasonableness of the effort put forth. Our production control for service work has been achieved by application of standard time values for the various items on each order's completed work report, plus similar time values for driving, office time, phone dispatcher, etc. Contrary to the experiences of many plants, or even whole industries, our rate of production has been maintained all during the war and is still at essentially our prewar satisfactory level.

Basis for Time Values

As in all sound production control systems, our standard time values depend on field time study observations of actual operations. To insure the normality of service work performed under time study observation requires more careful handling than for factory work. Our time study observers have been selected from among the top serviceman group and trained in both methods and time analysis. One of these men accompanies a serviceman throughout a day's work, but extreme precautions have been taken to prevent any actions of the serviceman from being disclosed by the time study observer in a personally identifiable way. Even the time study man's notes, etc., are carefully kept void of reference to the individual observed. With a satisfactory non-supervisory relationship between worker and observer, the work is performed by the serviceman essentially the same as if not under observation.


Page 5

Helpful Henry Sez-

Henry Walker out at Beverly Hills has found a new use for the vacuum pump. He's saving time, and also his temper, by blowing loose lint or dust out of Servel burner tubes and orifices without making a complete disassembly, and has sent us the following job description: Remove the turbulator, put the adaptor in place as if you were going to take the pressure, then attach your pump and blow.

It seems that most of the lint or dust collects on the orifice face and around the primary air ports on the burner tube. When you pump in air at a high velocity, it creates a suction through the air ports, pulls the lint into the tube, and forces it out the front of the burner.

This shortcut may not work on every job, but it will cut down on the number of burner disassemblies you're making now. If you can keep from burning your fingers only half of the time, it'll be worth it.

Items appearing herein are not to be construed as operating instructions, and are presented only on the basis that field trials by the suggestor have proved them satisfactory.

Fig. 2. "Henry" informally publicizes shortcuts discovered by servicemen, does not have the force of operating instruction.

In this type of activity, it is only natural that among the many different servicemen a variety of methods are encountered. From time study observations, the time required to perform certain operations and frequency of occurrence is determined. By combining the best from the various practices so far evolved in the field, more effective methods for important problems can be worked out.

Proof Required

In some cases the biggest problem in issuing to all field personnel the shortest and most practical methods observed is the proving to our own supervision and engineering technicians the practicality of the field answer. For example, oven calibration procedures as recommended by the manufacturers and the AGA Range Manual specify a 45-minute heating followed by three temperature readings at five-minute intervals. This is a total of one hour to verify the accuracy of an oven thermostat, with additional time required if the setting is changed. Some field men were performing calibrations in a great deal less time than this, and actual tests, making time temperature curves for various makes of ovens, have now resulted in verification of the practicality of greatly cutting this time. The follow-up of field experience with proper laboratory engineering resulted in adopting a method of oven calibration which, for the modern bellows type controls, permits satisfactory calibrations in 15 minutes.

A somewhat similar situation was involved in lubricating the Grayson combination oven valve and control. In this case, some field men had applied oil without disassembling the control and found that it worked. However, in some cases an excessive amount of oil was applied because field personnel lacked definite knowl-

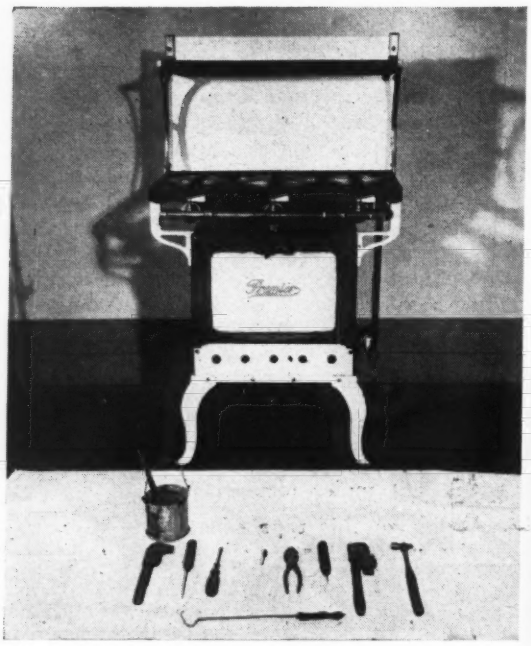


Fig. 3. The old way: Early ranges such as the one shown here required less than a dozen tools.

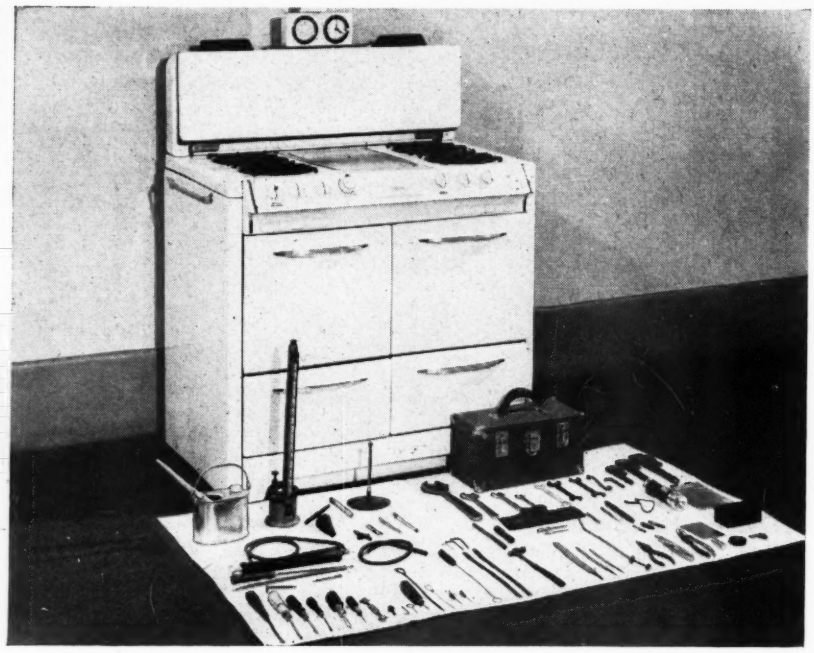


Fig. 4. The new way: Flush-to-wall construction, sealed manifolds, automatic controls have necessitated impressive array of tools shown here.

edge as to exactly where the oil should be applied on the control. Here again, the formal recommended practice for many years required the disassembly of the control, cleaning, lubrication, and recalibration—a job normally involving approximately an hour. A study of this particular problem resulted in the adoption of a procedure for oiling one effective point on the control, with instructions to follow the old routine in cases where the short method was not effective. Actual experience has proved that the oiling alone, which can be done in a matter of a couple of minutes at the most, has remedied the majority of the sticking or hard-to-turn cases. Again, the method worked out by combining practical field results with further analysis and study represents an impressively large reduction in the amount of time required per such job.

"Helpful Henry"

One problem inherent in service work on the vast variety of customers' appliances is the determination of when a particular problem occurs frequently enough to warrant a thorough study. On the other hand, it is evident to any observer that a considerable amount of time could be saved if each serviceman knew the best manner in which each job had previously been performed. The desire to publicize as many shortcuts as possible without the necessity of making formal or substantive engineering or laboratory investigations, led to the development of a "Helpful Henry" poster technique which is distributed by the training section.[2]

"Helpful Henry" provides a medium of at least exposing the entire service group to minor servicing kinks and shortcuts which do not warrant exhaustive investigation or special training classes, but which prove extremely worth while when their particular occasion arises.

Tools, Trucks and Equipment

The trend that has been apparent in the automotive field is also in evidence in hand tools for appliance service work. Modern appliance improvements such as flush-to-wall constructions, sealed manifolds and automatic controls have made it necessary to provide servicemen with a wide variety of tools. Consider the range shown in *Fig. 3* and the few tools required for complete service; then look at the modern range shown in *Fig. 4* and the tools now required in modern servicing.

In spite of the number of tools shown here, requests for additional tools are continually being received. Obviously, a safe and reasonably satisfactory tool must be furnished for every job required of our servicemen, but special or limited-purpose tools must be avoided whenever possible.

The time study men with their methods training and their observing of many different workers can provide the close-to-the-problem review, or can suggest field trials where warranted, in regard to tools, tool kits, tool trays, truck arrangements,[3] miscellaneous equipment required, etc. For example, difficulties were encountered in attempting to order correctly and obtain certain numerous small items—bolts, nuts, washers, caps, orifices, etc.—which permit a much better job to be done and customer satisfaction to be increased out of all proportion to the material cost. An employee suggestion resulted in sample boards in each district which, combined with night loading, have effectively solved this problem. The picture of this sample board, *Fig. 5*, also illustrates the growing complexity of appliance servicing work.

Summary

The importance of cost control through production controls and the development of methods to simplify work routines cannot be over-emphasized. The analysis of a serviceman's eight-hour day to obtain the number of hours actually spent servicing appliances can be startling. The time necessary in preparing for work—looking over orders, contacting supervisor, stopping at storeroom—then time spent in traveling from job to job, calling the office, clerical time spent in filling out completed orders, returning from the field, and finally making out the time report, etc., adds up to a very sizeable percentage of the eight-hour day.

It is the Standards Section's respon-

[2] "A Proven Employee Suggestion and Field Observation Program" by W. E. Otis, PCGA Utilization Conference, February, 1947.

[3] "New Methods Engineered Customer Service Truck," by W. K. Stevenson. Minutes of the Combined Automotive and Distribution Conference, San Mateo, Spring 1947.

sibility to develop procedures to make more hours available for service to the customer. Furthermore, acceptable work habits and "short cuts" must continually be investigated and developed.

Part 2. Employee Training

FACTUAL information developed statistically from the completed field orders and suggested improvements on methods and procedures must be disseminated to field personnel, and training procedures for new personnel must incorporate these continuing changes. Training methods over the past years have been adjusted to meet this objective, as well as to incorporate the new developments of modern gas equipment.[4-5]

The trend toward fully automatic appliances has resulted in the manufacture of a greater variety of controls and safety devices, with current figures showing 980 different models. Some of these new safety devices not only close the supply of gas in case of pilot outage, but are equipped with flow interrupters to insure safe lighting. These new features add to the complexity of the design, thereby emphasizing the need for a formal training program.

The American Gas Association lists the following individual appliances:

Appliance	*No. of Makes and Models*
Range	585
Water Heater	1200
Space Heater	525
Central Heating	780
Miscellaneous (Hair driers, refrigerators, etc.)	61
TOTAL	3151

The training program which is given by the Employee Training Staff of the Southern California Gas Co. consists of two courses designed to train two separate classifications of servicemen—Serviceman No. 2 and Serviceman No. 1.[5]

District Meetings

District meetings are conducted by the Employee Training Staff members for the purpose of acquainting established servicemen with new controls and servicing techniques.

Control boards are used in these meetings. The instructor demonstrates lighting techniques, valve greasing, methods of calibration and discusses servicing problems. In addition, written instructions are given to each serviceman for filing in his set of appliance manuals.

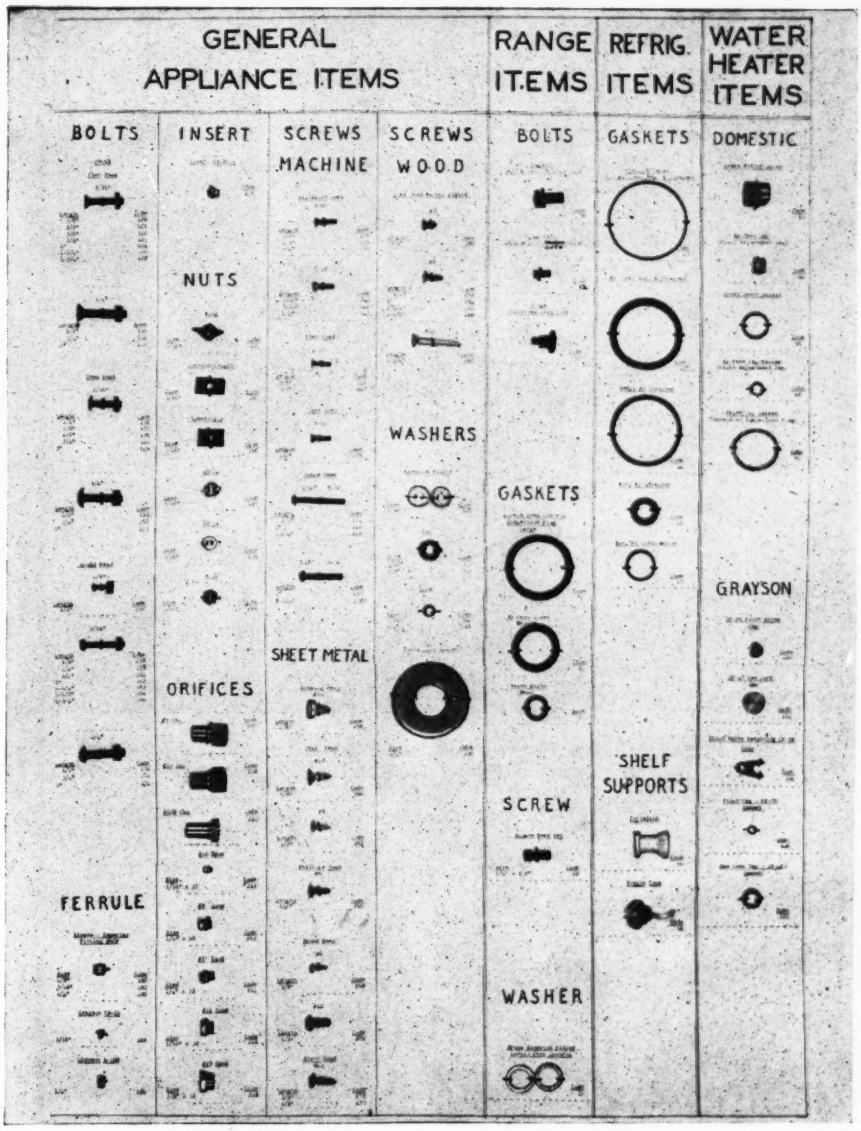


Fig. 5. Sample board of parts required in servicing. Located in each district, they facilitate correct ordering of the many complex parts needed in modern service work.

Dealer Service Training

This activity is carried on by members of the training staff. Calls are made on firms that do any kind of gas appliance installation or servicing work on the lines of the Southern California Gas Co., and their servicemen are urged to attend these instruction classes. During 1946, 47 instruction classes were conducted for members of the Heating Institute, plumbers and range installers. A total of 1689 servicemen from these outside firms attended the meetings.

Range installer meetings are normally held in one of the gas company auditoriums and have proved successful by reducing the number of follow-up service calls we are asked to make on new appliance installations.

Summary

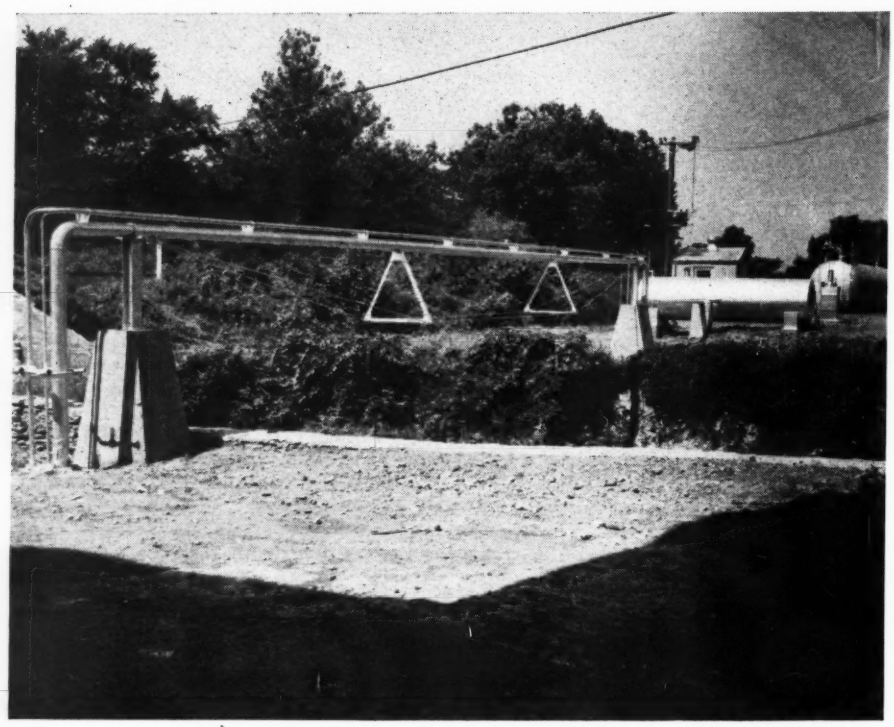
The training methods now being used have been in effect over a sufficiently long period of time to permit a number of conclusions to be drawn regarding their effectiveness.

1. During the first six months of 1947, a total of 137 servicemen were trained. Of this total, 82% qualified for their classifications, 12% were disqualified during the classroom training period, and 6% were disqualified in the field before the end of the probationary period.
2. The supervisors who hire and send the new men into training have expressed their confidence in the present training methods.
3. The dealer training routines have the interest of the plumbers, Heating Institute, and installation agencies, as indicated by the attendance and requests for additional meetings.

[4] "Developments in Employee Training," by C. C. Westmoreland, 1944 PCGA Proceedings, Vol. 35.

[5] "Current Developments in Employee Training," by C. C. Westmoreland, 1946 PCGA Proceedings, Vol. 37; GAS, Aug., 1946.

Outwittin



Over truss, constructed beyond flood water's reach, passes made gas through a 6-in. line. Two small lines carry liquid and vapor. In background is propane-air equipment.

Closeup of installation. At left is surge tank, center is "Gasair" machine, and behind it the vapor pump house. At far right is the 25,000-gal. propane storage tank.

A propane plant aimed at cutting operating costs and preventing service interruption in time of flood has just been installed by Pacific Gas Corp. for 100% service of the city of Lebanon, Ohio.

Exclusive

An unusual feature is a truss, built high and strong enough to span the local creek with a pipe line, thus enabling the system to stay in operation in time of the maximum flood waters that the town experiences. The truss measures some 58 ft. center to center. The made gas passes from the surge tank through a 6-in. line over the creek.

All foundations in the plant are raised above maximum flood water conditions so that no matter what happens the plant will always be available for gas, and there will be no excuse for the city being out of gas as it has been at several times in the past.

Economy of operation of the plant is shown in the fact that one man in about two hours a day should be able to operate it, according to Francis E. Drake, chief engineer of Pacific Gas Corp.

The Lebanon plant, Mr. Drake says, is typical of a number that are being installed in different parts of the country for the sake of economy and dependability of supply.

The plant was completed July 26 and is ready to go into operation as soon as changeover of appliances can be arranged and completed. Propane-air gas has already been made at the plant and backed up to the cut-off valve between the old and new systems. The old system makes water gas, and when the new plant is cut into service will be shut down entirely.

There are 1230 meters in Lebanon. The plant installed by Pacific is a municipal operation, under the Trustees of Public Affairs, L. F. Wertz, clerk and superintendent.

Pacific Gas designed and built the plant, and will supply the propane under contract. The company also gave instruction on its operation to the people who will have charge of it.

Reasons for Changeover

Reasons for the changeover to propane were the high cost of raw materials and labor and the many advantages of the propane plant, which is entirely automatic, requiring inspection only once or twice a day.

One 30,000 water gal. (25,000 propane gal.) tank was supplied. American Car and Foundry Co. built the tank to Pacific Gas' design. It follows ASME U-69 specifications, which is standard for all liquefied petroleum tanks.

Due to soil conditions it was necessary to figure on maximum loading of 1500 psi. All foundations were built under these specifications. There is 200 psi working pressure on the tank.

Two standard VM-4 "Gasair" combined vaporizer and mixer units were furnished. Each of these units has a capacity of 10 Mcf of gas per hour of any Btu designated. This gives a total of 20 Mcf per hour (480 Mcf per 24 hours).

loods With Propane

By EDWARD TITUS

Not infrequent floods play havoc with the water-gas system which has long been the gas supply system for the city of Lebanon, Ohio. Now the city has devised a way to keep its gas equipment above flood levels — and, incidentally, to save on operating costs. With newly-installed propane-air equipment, one man can keep it operative.

The Btu determined upon by the Trustees of Public Affairs and Pacific Gas Corp. officials for the changeover gas was 1300. This was decided on finally because there is a chance that at some time in the future natural gas will come into Lebanon. In this event, 1300-Btu propane-air gas will be closely interchangeable with the natural gas, meaning that probably no further appliance changes will have to be made.

Beyond the Gasair machines is a surge tank 8 ft. in diameter and 50 ft. long. The Gasair machines discharge into this surge tank, and from there the gas passes through a 6-in. line over the creek.

Above Flood Level

The whole plant is automatic and built high, and will continue to operate in flood time as long as there is propane in the tank. A full tank should last close to two weeks. But the townsmen may have to use boats to get out to it.

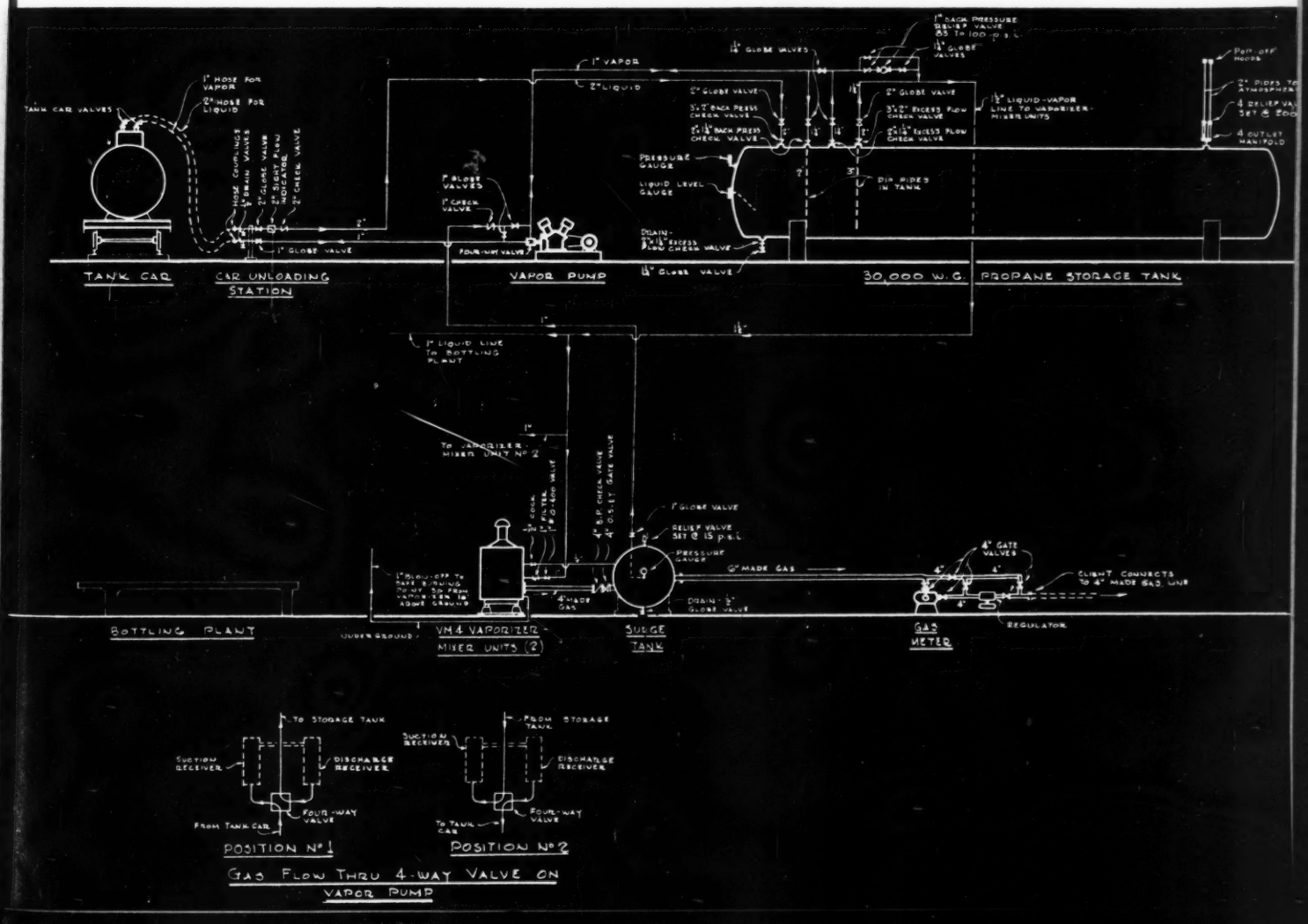
Even the vapor pump which is used for unloading the tank-cars and repressuring the storage tank sits up above the maximum flood waters, so that it always will function. An unloading station, incorporated with the vapor pump, was supplied.

From the surge tank the gas passes over the creek to a governor. Beyond the governor, Pacific Gas supplied a Roots-Connersville meter, which is good for 10 Mcf per hour. They put in a Cutler-Hammer thermeter, which gives continuous registration of the Btu's, and an American Meter Co. meter prover, five light size.

With the new plant all holders are dispensed with, and the gas is made as required and sent directly into the distribution system. With the 1300-Btu gas made, approximately 4½ psi will be generated into the surge tank and reduced down to whatever may be required in the distribution system by a regulator furnished by Pacific Gas.

With the introduction of 1300-Btu gas, the distribution pressures on the Lebanon system probably will be lowered appreciably. The additional Btu's over the 525 furnished up to now mean that the distribution system will have approximately twice its former capacity.

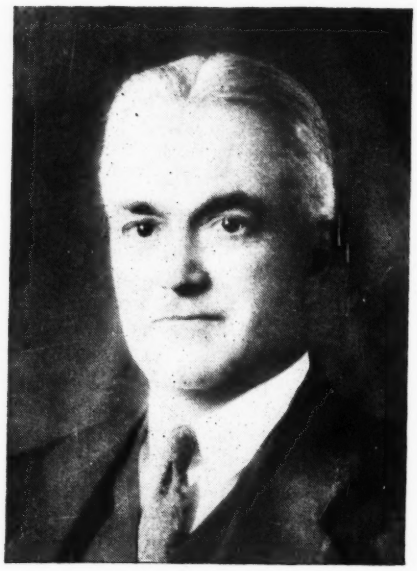
Oiling and fogging are arranged on the Gasair machines so that the distribution piping system may be kept in its present condition, thus preventing increased leakage. This is the usual practice in all systems where cast iron mains are involved and there is a changeover from manufactured to either natural or propane-air gas. Both of these latter are dry gases and quickly absorb moisture from jute or yarn incorporated in the bell and spigot joints. When this moisture is removed, leakage increases. By retaining the moisture through the introduction of oil, the jute or yarn is kept in its former expanded condition, thus minimizing any change in leakage.



Increased Demand Taxes Appalachian Region Supply

By LORING L. TONKIN

President, Hope Natural Gas Co.
Clarksburg, W. Va.



DURING the long war years, and during the years we were preparing for war, the resources of all natural gas companies in the Appalachian region were called upon to do everything possible to supply gas to the war industries in West Virginia, Pennsylvania, and Ohio. The companies responded to this urgent call by drawing heavily on their gas reserves at a much greater rate than was thought wise, but there was no alternative—the war demands were paramount.

We knew then, early in 1943, that we would have to get additional supplies of natural gas from the southwest and the Hope Natural Gas Co. proposed and planned laying a line to the southwest at that time. When the Federal Power Commission gave permission to another company to lay the line, the Hope company sold out its proposed rights of way at cost.

This line to the southwest was completed in November, 1944, and has been bringing large quantities of natural gas into this region since that time. There are also substantial quantities of natural gas from Texas coming into this region through the "Inch" lines, which were turned over to natural gas use last December.

Why Large Demand

These three lines are now bringing into the area about 450 MMcf of gas per day and, by Nov. 1, 1948, should be delivering up to 900 MMcf per day. You may well ask why all this extremely large amount of natural gas is needed in the Appalachian region over and above what we have been getting. There are several reasons.

In the first place, *all* natural gas men underestimated the demands that would be made upon our gas companies after the war. Demand did not turn out as predicted, and the demands for industrial gas today are greater than during the war.

It is only fair to say here that the natural gas industry is not the only industry which misjudged the postwar trend; the railroads, steel industry, the oil industry and others also judged postwar conditions incorrectly. Even the administration in Washington misjudged what would happen; for instance, they predicted large unemployment throughout the nation, but we now have over 60 million people employed in the United States.

Another reason for the shortage of natural gas throughout this region is the fact that the domestic consumption of natural gas has increased enormously. This is due, to some extent, to the building of new houses but largely it is because of conversion to natural gas in the heating of old houses formerly heated by coal or oil. Natural gas can now be used for heating homes as cheaply, or cheaper, than they can be heated with coal in a great many cities. Also, people have become so disgusted with the uncertainty of their coal supplies that they are trying to convert to natural gas more rapidly than the gas companies can possibly keep up with them.

By Nov. 1, 1948, then, there will be brought into the Appalachian region 450 MMcf of gas per day more than at present, or approximately 160 billion cu. ft. per year. Let's look at the requirements of the principal natural gas companies of this region. These figures represent between 90% and 95% of all the natural gas consumed in the Appalachian region:

1. In 1946 the annual requirements of these companies were 547 billion cu. ft.
2. In 1947 the annual requirements are estimated to be 660 billion cu. ft.
3. In 1948 the annual requirements are estimated in excess of 700 billion cu. ft., or an increase of more than 150 billion cu. ft. in 1948 compared with 1946. This is in line with the new gas supplies that will be coming into this region from the southwest, in the amount of 160 billion cu. ft.

It is worthy of note that the peak load demands on the natural gas companies in this region have also jumped by leaps and bounds:

1. In the 1945-46 winter the peak load was 2.3 billion cu. ft. per day.
2. In the 1946-47 winter the peak load was 3.1 billion cu. ft. per day.
3. In the 1947-48 winter the peak load is estimated at 3.4 billion cu. ft.

To help meet these peak loads the natural gas companies generally have stored large quantities of gas, chiefly underground, the importance of which can hardly be overestimated. For instance, these companies, at the end of 1946, had in storage 86½ billion cu. ft. of natural gas but they expect, at the close of 1947, to have 101½ billion cu. ft. in storage.

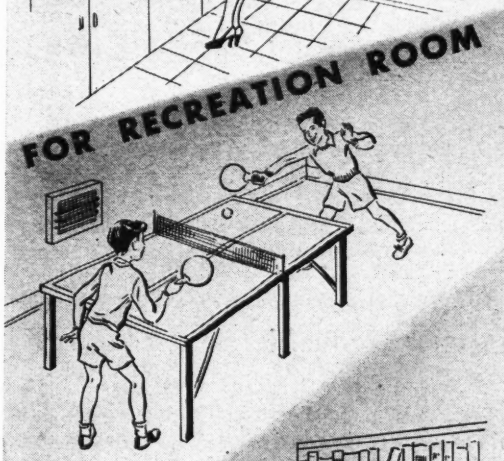
The importance of having more gas in storage is shown by the deliverability of natural gas from storage with the different amounts in the storage pools. For instance, 86½ billion cu. ft. in storage will deliver 712 MMcf per day while 101½ billion cu. ft. in storage will deliver 978 MMcf per day. If it were not for these storage areas we could never hope to meet our peak load requirements.

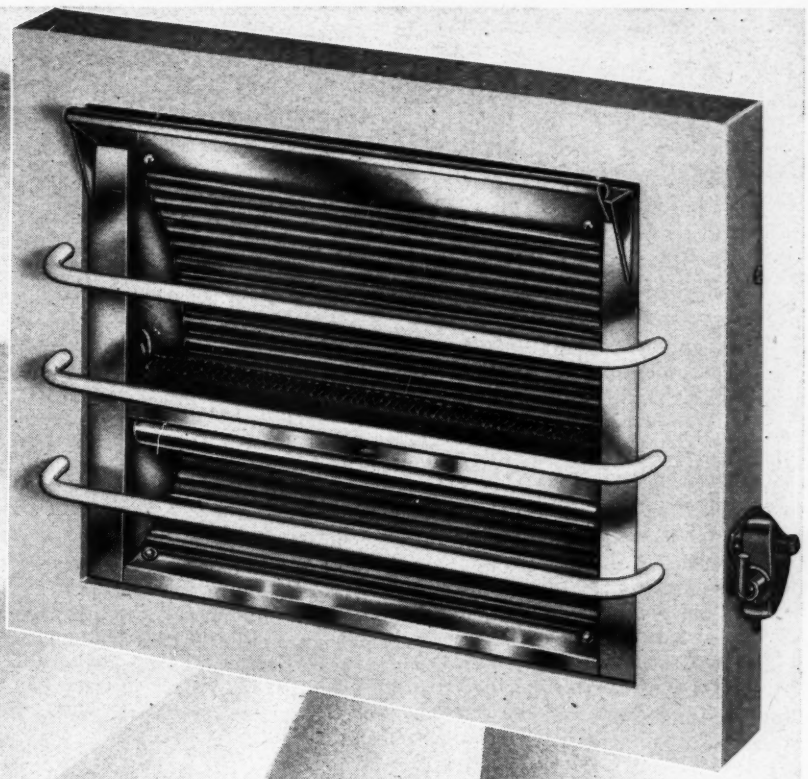
Shortages to Decrease

In order for the natural gas companies in the Appalachian area to handle this large increase of gas from Texas, it was and is necessary for these companies to spend large sums of money to distribute it to their customers. The Hope Natural Gas Co. alone in 1946 had a capital budget of $10¼ million, in 1947 over $15 million, and in 1948 over $8 million—a total for the three-year period of over $33 million, all of which will be spent in West Virginia.

I look for some curtailment of industrial gas next winter somewhat after the pattern of last winter but I hope it will not be quite as bad. After the coming winter, however, I believe that most of the natural gas companies in this region will be in a position to supply all the demands of their consumers and have some surplus gas.

Presented at Appalachian Gas Measurement Short Course Aug. 26.





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New comfort for your customers is assured with the Humphrey Rafire Wall Heater. This smartly styled, efficient heater is ready on a minute's notice to supply a generous amount of pure, radiant heat. Wherever EXTRA heat is needed — for bathroom, living room, recreation room, kitchen or den — the Rafire Wall Heater is ideal for meeting this demand.

A specially designed efficient burner quickly heats the Chromel heating element to a beautiful incandescence, and a sparkling Chrome reflector radiates the heat directly into the room. The Rafire Wall Heater is of all metal construction, quality built throughout. Operates equally well upon Natural, Manufactured, and Liquefied Petroleum gases.

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A HUMPHREY PRODUCT

Winter Supply

Fuel outlook discussed At Appalachian course

THE question on everyone's mind, "How about our natural gas situation during the coming winter?" was answered by Loring L. Tonkin, president of Hope Natural Gas Co., at the Aug. 26 banquet of the Appalachian Gas Measurement Short Course, in Morgantown, W. Va., as follows:

"I look for some curtailment of industrial gas next winter somewhat after the pattern of last winter, but I hope it will not be quite as bad. After the coming winter, however, I believe that most of the natural gas companies in this region will be in a position to supply all the demands of their consumers and have some surplus gas."

And at the opening session of the short course, G. W. Harr, manager of the gas department of the Monongahela Power Co., Fairmont, W. Va., stressed the supply problem, stating that "every time the price of coal goes up $1 a ton, it affects us. Everybody seems to want gas then."

Dr. Richard Aspinwall, assistant president of West Virginia University, whose School of Mines is the scene of the short course each year, informed the 500 attending that:

"Your research program did not start too soon. Much natural gas has been wantonly dissipated."

Tonkin, introduced to the banquet audience by Joseph M. Low, chairman of the entertainment committee, and toastmaster, told his listeners that they might well ask why all this extremely large amount of natural gas is needed in the Appalachian region over and above what we have been getting. He gave some reasons, as follows:

First, all natural gas men underestimated the demands that would be made on gas companies after the war. But they were not the only ones who misjudged postwar trends, since the railroads, the steel industry, the oil industry and the administration in Washington also misjudged what would happen.

Secondly, there has been an enormous increase in the domestic consumption of natural gas, resulting both from building of new houses and conversion to natural gas in the heating of old houses. Behind this trend are the facts that natural gas in many cities is as cheap or cheaper than coal for this purpose, and that many people are disgusted with the uncertainty of coal supplies.

Tonkin also reviewed the figures for recent years and mentioned estimated figures for annual requirements and peak load demands in 1948.

The proceedings, both at the official opening and at the banquet, were opened by Gordon Stuart, of the Equitable Gas Co., Pittsburgh, Pa., chairman of the general committee for the short course.

George H. Smith, of New York, assistant managing director of the American Gas Association, and director of the Natural Gas Department of the association, addressed the opening meeting on the subject "Accuracy Always Pays."

"Good metering in the gas industry is that which delivers an amount that is commercially accurate," he said.

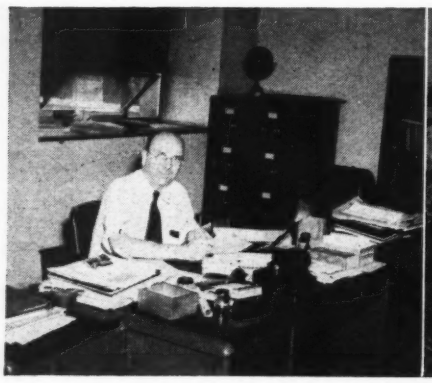
He pointed out, however, that refinement in accuracy could be overdone, and "carried beyond economic advantage," and that "we're selling service as well as quantity of fuel."

The important principle, Smith said, is "delivering a fair quantity at a fair price."

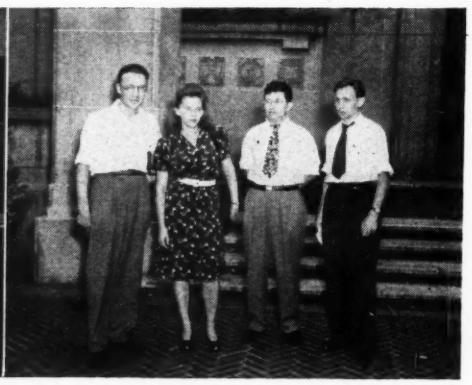
Dr. Irvin Stewart, president of West Virginia University, greeted the guests at the banquet.

Among officers elected for the coming year were Lawrence Hunter, of Columbian Carbon Co., Charleston, W. Va., as chairman of the general committee, and W. P. Smith of Godfrey L. Cabot, Inc., as chairman of the program committee. Mr. Hunter served as chairman of the program committee for this year's short course.

The primary purpose of the three-day short course school is "to provide an opportunity for persons interested in the quantity measurement and pressure regulation of gas, to obtain information on repair and operation of equipment used for that purpose, and to acquaint them with the latest developments in the gas measurement and pressure regulation field."



Charles T. Holland, professor of mining engineering at West Virginia university, served as a member of the executive committee of the Appalachian short course.



This group, composed of Russians A. Mikhailov, G. Goun, B. Polyanin, and B. Semenov, from right to left, represented the Amtorg Trading Corp. of New York City.

Gas At Metal Show

The American Gas Association combined exhibit at the National Metal Exposition and Congress to be held in the International Amphitheatre, Chicago, Oct. 18-24, will be the largest and most comprehensive gas exhibit ever sponsored by the association. With 12 nationally known concerns cooperating, it will be the largest single exhibit in the metal show and will occupy practically an entire end of the main exhibit area.

In keeping with the importance of this annual exhibition, the traditional Industrial Gas Breakfast will be held on Wednesday morning, Oct. 22 at the Hotel Stevens. This annual breakfast is always one of the best attended functions during metal show week and is considered a highlight of the gas industry activities.

AGA Notes

Vacuum Heat Treating. "Research in Controlled Vacuum Heat Treating" is a report on AGA research project IGR-49 and presents experimental data, conclusions, and deductions on work done to determine the practicability of heat treating when there is no atmosphere surrounding metals during the heat treating cycle.

This work constitutes the third step in a series of projects sponsored by the Committee on Industrial and Commercial Gas Research. The first was a study of heat treating when the work is surrounded by reducing atmospheres produced by the products of combustion in open fired furnaces. The second was pioneer work in the use and effects of prepared or synthetic atmospheres—which has developed

into extensive commercial applications, and the third is the present study of heat treating under vacuum.

George A. Uhlmeyer, of the Iowa-Illinois Gas & Electric Co., Rock Island, Ill., acted as committee sponsor for this project.

Corrosion Research. "Literature Review of Corrosion of Metals and Materials by Flue Gas Condensate" is a preliminary report on research project DGR-4-CH "Research in Corrosion, Oxidation and Deterioration of Metals under the Influence of Products of Combustion of Gaseous Fuels." It contains a summary of the current status of our knowledge of the causes and effects of corrosion of metals used in gas appliances construction, by flue gas condensate.

Laboratory work, which is directed toward an intense qualitative and quantitative study of gas appliance corrosion particularly as applied to heating appliances, is now under way at Battelle Memorial Institute. The results of this intensive laboratory work will be included in later reports.

Project DGR-4-CH is under the supervision of the technical advisory group for central gas space heating research. Keith T. Davis is chairman and William M. Myler, Jr. is project sponsor for this project.

OTHER ASSOCIATIONS

CNGA Fall Meet

With three out-of-state and two California men on the speaking program, the California Natural Gasoline Association's 1947 fall meeting will be held Friday, Oct. 10, at the Ambassador hotel, Los Angeles, Frank J. Colton, CNGA president, has announced.

Plans are also being made for an all-day session of CNGA's technical committee on Thursday, Oct. 9, to which members of the technical committee of the Natural Gasoline Association of America will be invited.

Speakers at the meeting and their topics are as follows:

Adaptability of Centrifugal Compressors to Gasoline Plant Operations by Dan McDonald, Magnolia Petroleum Co.

Motor Fuel Sensitivity by E. J. McLaughlin, California Research Corp.

Cycling at High Pressures vs. Depletion and Cycling at Low Pressures by E. O. Bennett, consulting engineer.

Future Outlook for Btu's in California by Marion Dice, General Petroleum Corp.

C. L. Moore, El Paso Natural Gas Co., will give a general descriptive paper on that company's operations in connection with the delivering of natural gas to California.

LP-Gas Regulations

The effect on gas appliance installations of proposed LP-Gas regulations by the Texas Railroad Commission was considered at a meeting of representatives of the Gas Appliance Manufacturers Association held Aug. 25 at the Statler hotel, St. Louis.

Upon the suggestion of the Texas commission, a committee was selected to make recommendations concerning the proposed regulations at a hearing of the commission scheduled for Sept. 29 in Austin, Texas. The recommendations of the committee were to be presented to the railroad commission of Texas by William Lawson, executive secretary of the Texas Butane Dealers Association.

The committee is composed of the following: Lee A. Brand, chairman; W. A. Coleman, Keith T. Davis, F. R. Fetherston, Arthur C. Kreutzer, R. O. Montrief, I. P. Newby, John Knox Smith, Art Theobald, and H. Leigh Whitelaw.

CGA Plans Changed

The original selection of a meeting place for the Canadian Gas Association convention has been changed from Vancouver, B. C., to the Jasper Park Lodge, Jasper, Alberta. Dates set for the convention are July 1-3, 1948, according to George W. Allen, executive secretary and treasurer.

As well as planning full cooperation in the Canadian event, including the contribution of some valuable papers to the program, Pacific Coast Gas Association members may attend the convention.

Porcelain Institute

E. A. Jamison, Philgas Division, Phillips Petroleum Co., addressed the Ninth Annual Forum of the Porcelain Enamel Institute on "Use of Liquefied Petroleum Gas" at a meeting held Sept. 10-12 at Ohio State University, Columbus. Jamison's talk was mainly directed to plants considering fuel changeover or standby to present fuel.

Jamison discussed the use of LP-Gas, other gaseous fuels and fuel oil for porcelain-enameling operations.

CALENDAR

October

International Gas Union—Lausanne, Switzerland, Oct. 3.

American Gas Association Annual Convention—Cleveland, Ohio, Oct. 6-8.

National Safety Congress and Exposition—Chicago, Oct. 6-10.

Texas Mid-Continent Oil and Gas Association—Gunter Hotel, San Antonio, Oct. 16-17.

National Metal Congress and Exposition—Amphitheater, Chicago, Oct. 20-24.

American Standards Association—Waldorf-Astoria, New York, N. Y., Oct. 21-23.

November

National Hotel Exposition—Grand Central Palace, New York, N. Y., Nov. 10-14.

Mid-Southeastern Gas Association—Raleigh, N. C., Nov. 13-14.

Employee Relations Conference—Adolphus Hotel, Dallas, Texas, Nov. 19-20.

December

American Society of Mechanical Engineers Annual Meeting — Dec. 1-5.

February, 1948

8th International Heating & Venting Exposition—Grand Central Palace, New York, N. Y., Feb. 2-6.

March

New England Gas Association—March 18-19.

Southern Gas Association—March 24-26.

Mid-West Regional Gas Sales Conference—Edgewater Beach Hotel, Chicago, March 29-31.

April

Gas Appliance Manufacturers Association Annual Meeting — Drake Hotel, Chicago, April 5-7.

American Gas Association Sales Conference, Industrial and Commercial Gas Section—Windsor, Canada, April 7-9.

Joint AGA-EEI National Conference of Electric and Gas Utility Accountants—Hotel Jefferson, St. Louis, Mo., April 12-14.

National Restaurant Association Show—Cleveland, Ohio, April 12-17.

Distribution-Motor Vehicle Conference—Hotel William Penn, Pittsburgh, Pa., April 19-21.

Indiana Gas Association Convention—French Lick Springs Hotel, French Lick, Ind., April 22-23.

EXPANSION

Speedup

Early action on request for permanent operation of Big Inch predicted

AT long last, the gas industry last month could look forward to a final decision in the case of the Big and Little Inches. Granting that speed is now imperative if partial easement of the winter gas shortage in the East is to be achieved by 1948-49, the FPC waived the usual requirement for filing briefs and cleared the stage for oral arguments to start Sept. 25.

An added note of urgency is the fact that the date on which Texas Eastern Transmission Co., applicant, must make final payment on the lines to the War Assets Administration is Nov. 1.

To be sure, Texas Eastern is already installing six additional compressor stations along the line designed to boost capacity from 140 MMcf to 265 by Nov. 1. But the necessity of an early end to the hearings, which began in early July, in order to permit Texas Eastern to put through its financing program was conceded by the commission, in view of the fact that upon financing hinges the addition of 17 compressors to boost throughput to its 433 MMcf rated capacity by August, 1948.

The commission granted Texas Eastern's motion to waive filing of briefs Aug. 21. Oral argument was first set for Sept. 22, then postponed three days.

As soon as the company receives commission approval, it will file with the Securities and Exchange Commission for a $120 million bond issue and $32 million stock issue. By 1950 a total capital investment of $170 million is anticipated.

Meanwhile the storm still raged over where the gas was to go. Norman F. Patton, Pennsylvania Anthracite Commission, told the FPC that "whole towns would go on relief" if the Inches were to carry gas through Pennsylvania to the eastern seaboard. Since the line crosses the heart of the hard coal region, the application of Texas Eastern is "not in the public interest," he said.

Texas Eastern's president, R. H. Hargrove, stated his company had no plans for transporting gas east of Philadelphia. But at a later date, he added, he might want to take up the extension of the Inches to the east coast and serve such markets as New Jersey, New York, and New England.

He urged, however, that rights to use the lines all the way to the eastern end be given Texas Eastern now.

Potential customers were jockeying for position in the race for the gas. The East Ohio Gas Co. was given temporary commission approval on its plan to construct and operate 84 miles of 20-in. line to receive added quantities from the Inches. The project would cost $3.2 million and would serve only present customers of East Ohio. And the Indiana Gas & Water Co. asked the commission to direct Texas Eastern to tie in to its lines near Millhousen, Ind. To be served by the connection are 2150 customers in and around Greensburg, Ind. Inch gas would be used as firm load, with peak loads to be satisfied from the Greensburg field, at present sole source of gas for the area.

Gas for PG&E

El Paso may build second line, boost export to California to 505 MMcf

EL Paso Natural Gas Co. deliveries to California may reach a total of 505 MMcf daily by 1952 according to a recent FPC report. El Paso is seeking commission approval of a $55.4 million project including a 26-in. 438-mile transmission loop line which would increase by 100 MMcf per day the delivery capacity of the previously authorized 26-in. line from Lea county, N. Mex., to Blythe, Calif., and a 26-in. line from San Juan county, N. Mex., 470 miles to the California-Arizona border near Needles, Calif. Initial capacity of this latter line would be 100 MMcf per day. Gas reserves are being developed in the San Juan basin by Western Natural Gas Co., an El Paso Natural affiliate. A purification and dehydration plant with 100 MMcf capacity is to be operated in connection with the San Juan line.

The San Juan Basin-Needles line will be built in 1950 and 1951 and scheduled deliveries to Pacific Gas & Electric Co. will begin on Jan. 1, 1952. Construction of the Permian Basin-Blythe looping is planned for 1952 or 1953, depending upon needs of the California gas market.

El Paso Natural has placed orders for compressors with Clark Bros. Co., Inc., Ingersoll-Rand Co. and Cooper-Bessemer Corp. Installation of these units, which total 85,000 hp, will begin Nov. 1, 1947, on the Lea county to Blythe line.

Five-Year Plan

Lone Star reveals details on expansion program to cost $40 million

DETAILS of the $40 million, five-year expansion program of Lone Star Gas Co. have been revealed by President D. A. Hulcy. The project for 1947, announced in the September issue of GAS, entails expenditures of $12 million, about half of which have already been completed. The firm contemplates spending $10 million in 1948 and $18 million during the three-year period from 1949 through 1951.

The 1947 plans call for establishment of new distribution plants in 14 towns. This project alone will add more than 2500 meters to Lone Star lines. In addition, customers in established distribution plants throughout the system have increased by more than 28,000 since June, 1946.

Hulcy listed principal expenditures in 1947 as follows: Pipe line construction in field gathering and transmission systems, $2.5 million; service lines, street mains, and other equipment required for new town distribution plants, $3.2 million; acquiring leases and drilling wells, $2.25 million; dehydration, cycling and gasoline plants, $1 million; compressor station construction and improvements on more than 5000 miles of transmission lines, $900,000; expansion of butane facilities, $700,000; new office buildings and furnishings, $375,000; supplementing of existing facilities, such as automotive equipment and machinery and tools, $1 million.

Specific items in the 1947 program include exploration and development in producing areas where the company obtains gas, such as east central and west central Texas, and distribution plant construction.

A pipe line is now under construction from the Cumberland field west of Durant, Okla., to increase delivery to towns and cities in northeast Texas.

The gas supply for towns in the company's San Angelo area will be strengthened by a 6-in. gathering line from three wells in the Eden field southeast of San Angelo.

A loop line is being constructed from a point south of Dallas to a point between Rockwall and Greenville to strengthen the gas supply for a number of towns extending east of Dallas, including Greenville, and a

major gathering line is being built in Young county.

A new compressor station is under construction at Trinidad to boost the gas supply for Dallas, Fort Worth, and other distribution plants through existing parallel 16- and 20-in. lines from the east Texas gas fields. The new 3200-hp station is designed to handle 200 MMcf of gas per day. The company is also planning enlargement of its compressor station at Pueblo in west Texas to conserve gas otherwise wasted in oil production.

Tennessee Asks Gas

East Tennessee Natural Gas Co. has filed a petition with the FPC requesting that the commission institute further proceedings and enter orders necessary to require Tennessee Gas Transmission Co. to sell and deliver gas to East Tennessee in such quantities as to enable the latter company to give adequate service to the following markets in Tennessee: Chattanooga, Knoxville, Columbia, Pulaski, Shelbyville, Murfreesboro, Cleveland, Athens, Alcoa, Maryville and a number of smaller communities.

Hearing on East Tennessee's application for authorization to construct the necessary facilities to serve those markets was held in Chattanooga May 26 to June 10 in conjunction with an application filed by Southern Natural Gas Co. for authority to build additions to its system.

The petition filed by East Tennessee stated that these markets are now without natural gas service and are dependent on TGT for their gas supply; that by written contract of Sept. 6, 1946, TGT agreed to supply the entire requirements of the markets; and that the maximum daily demand for such markets is estimated at 63,876 Mcf. The petition further stated that TGT did not propose to furnish such gas from additional main line facilities sought by it and recently authorized by the commission, but did intend to increase its deliveries to points north and east of the state of Tennessee, notwithstanding its earlier commitments to East Tennessee.

New Chemical Plant

Twenty-one thousand tons of sulphuric acid and 1.2 million lbs. of hydrogen cyanide per year is the estimated capacity of the Kearny, N. J., plant of the Chemical Division of Koppers Co., Inc., which began operations on Sept. 1. Ronald Barraclough, manager of the new plant which has been under construction for the past 11 months, stated that while

only sulphuric acid was to be produced at first, production of hydrogen cyanide is scheduled to begin in October, and that within a year other related chemicals will be included.

The plant will take hydrogen cyanide and hydrogen sulphide from coke oven gas and convert them into usable forms. According to Barraclough, it is the first plant in the country to recover hydrogen cyanide from a coke oven plant in pure liquid form, although this chemical occasionally is recovered from some coke oven operations in the form of salts.

Sulphuric acid will be produced from two raw materials—hydrogen sulphide recovered from coke oven gas produced by the adjacent Seaboard coke plant of the company by a new process known as hot vacuum activation, and from crude brimstone.

Emergency Line Okayed

The Federal Power Commission has granted temporary authorization to Cities Service Gas Co. allowing the company to start immediate construction of a pipe line proposed to bring additional gas from the west to the east side of the company's system. Cost has been estimated at $881,251.

The new line will run from a point near Guthrie on the company's Oklahoma City line to its Drumright compressor station in Creek county, Okla., and comprises a part of the facilities requested by the company in an application for authorization to construct alternate facilities to obtain gas to meet peak day demands during the winters of 1947-48 and 1948-49. The company filed the alternate application when it became apparent that they would not be able to secure the necessary pipe to construct a line to the Hugoton field by the time the supplies would be needed.

LP-Gas For Illinois Peak

At a recent conference with 40 builders, architects and dealers in Peoria, Ill., Roy K. Dallas, service sales manager for Central Illinois Light Co., revealed plans for installation of storage tanks for LP-Gas in the firm's territory. There will be no new space heating installations, it was pointed out, but the entire increase will be used to meet peak day demands during the coming winter.

Total cost of the tanks and mixing equipment is estimated at $300,000 for nine 30,000-gal. tanks at Peoria and six at Springfield, and one of about 18,000-gal. capacity at Washington.

Southern California Gas Co., which has decorated its territory with some of the most outstanding outdoor advertising posters in the business, has done it again.

This time it's one of those exterior murals which grace the north side of its main office building, and which have long been the talk of Flower street in Los Angeles. This one, however, is so good that it has even brought forth fan mail.

Theme of the poster is the gas company's evening concert, aired over a local radio station nightly except Sunday. It was painted from an original by Carla Duncan, a California artist. The hands were modeled from those of Werner Janssen, noted conductor.

Incidentally, try the music score on your old accordion. It's authentic, too—from the evening concert's theme song.

Maximum daily allocation for the area for the coming season is hoped to be increased to 33 MMcf, while the estimated peak load is set at 57 MMcf with 17 MMcf for major industrial and 40 MMcf for domestic, space heating, business and small industrial uses.

Central Illinois Light is a distributor for the Panhandle system.

Propane Standby Station

A new $100,000 propane gas standby station will be placed in operation by the Kokomo Gas & Fuel Co., Kokomo, Ind., before the end of 1947, it was announced recently by Ed M. Hahn, president.

Completion of this plant is another step in the carrying out of a $500,000 improvement and rehabilitation program by the company. An 8-in. gas pipe line has been constructed between Kokomo and Tipton, Ind., at a cost of $150,000. Another $150,000 was spent by the company in the extension of gas mains and in the installation of new booster pipe lines and regulator stations. Other improvements are planned at an estimated cost of $100,000.

Restrictions on use of gas still limit new and prospective customers at least for the coming winter months. However, no restrictions will be placed against users of gas for cooking, water heating and refrigeration.

Canadian Gas for U. S.

Northwest Natural Gas Co. is investigating the possibility of piping natural gas from Turner Valley to British Columbia and to Vancouver and cities in the northwestern United States. Consultants on the 1200-mile Tennessee Gas Transmission line which takes gas from Texas into Tennessee, and the El Paso Natural Gas Co. line which covers 1200 miles from central Texas to California, have been in Calgary studying the natural gas reserves of Alberta.

A line such as Northwest Natural is considering would depend on reserves, negotiations with the dominion and provincial governments, and procurement of an import permit by the Federal Power Commission.

12 MMcf Holder Planned

The South Bend, Ind., municipal gas utility is planning construction of a $1 million gas holder of 12 MMcf capacity for completion by early 1948. Work on the foundation will start this fall, according to Dalton Moomaw, South Bend city building commissioner. Erection of steelwork is contingent upon deliveries of steel mills and is not expected before mid-

1948. The city's gas storage facilities have been greatly overtaxed and outmoded for several years.

Rheem Branch in Canada

Rheem Manufacturing Co. has announced the formation of a subsidiary company in Canada, to be known as Rheem Canada, Ltd. The offices and plant of the new company are located in Hamilton, Ontario. President of the newly formed company is R. S. Rheem. Other officers are Trumbull Warren, vice president and general manager; Ronald L. Marks, secretary-treasurer; E. L. Prais, production manager.

Rheem Canada, Ltd., will manufacture steel shipping containers for the petroleum, chemical, food, paint and other industries. Products similar to those made in the Rheem plants in the United States will be added at a later date.

REGULATION

Agreement

Panhandle case settled; Detroit assured large gas reserve for winter

IN mid-August the FPC disclosed that it had asked the Federal District Court for Eastern Michigan, Southern Division, for an injunction to restrain Panhandle Eastern Pipe Line Co. from continuing to sell natural gas to Michigan Consolidated Gas Co. for resale to Detroit industries "in violation of the legal Panhandle rate schedule." The commission also asked that Michigan Consolidated be prevented from buying this gas from Panhandle, stating that it is needed for delivery to storage fields operated by Michigan Gas Storage Co. to meet next winter's demands by residential and commercial customers in Kansas, Missouri, Illinois, Kentucky, Indiana, Ohio and Michigan.

Sales objected to involved 27 MMcf daily destined for Briggs Manufacturing Co., Chrysler Corp., Ford Motor Co., Great Lakes Steel Corp. and the Solvay Process Co. Prompt action, the FPC emphasized, would mean an addition of more than 1 billion cu. ft. of gas to the amounts in storage for the coming winter. Commission action followed a series of conferences in which representatives of utility companies distributing Panhandle gas and interested state commissions sought agreement on a program which would best meet the needs of all concerned in the emergency.

On Aug. 25 Federal Judge Arthur J. Koscinski announced that attorneys for the FPC, Michigan Consolidated and Panhandle had worked out a compromise to end the court dispute. Terms of the agreement included:

1. Building up of a 1 billion cu. ft. natural gas reserve in storage fields at Big Rapids, Mich.
2. Diversion to storage by Michigan Consolidated of 20 MMcf of its 125 MMcf quota between Aug. 27 and Sept. 30 to create the reserve.
3. A guarantee that Panhandle will replace withdrawals from the reserve by Consolidated during the winter months up to 30% of the total reserve if Consolidated uses that amount in addition to its daily quota.
4. Agreement by Panhandle not to transfer gas to Canada except on Labor Day week-end and to charge Consolidated its 125 MMcf quota rate even though it is storing part of the quota.
5. A promise by Consolidated that it will attempt to store all gas possible in the reserve from Oct. 1 through Nov. 30.

Federal Power Commissioner Leland Olds was instrumental in drawing the agreement which, according to Henry Fink, Consolidated president, places Detroit in the best position of any city in the Middle West.

The order halting the suit brought by the FPC permits reopening by any aggrieved party.

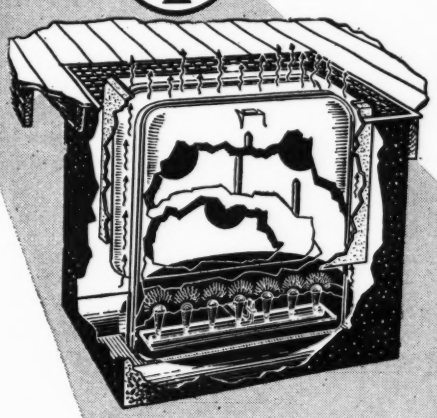
New Evidence Okayed

Southern Natural Gas Co. has been granted FPC permission to file limited additional evidence supplementing its application for authority to construct facilities to augment its present gas system and to supply several new markets in Mississippi, Alabama, Georgia and Tennessee.

During the original hearing last May 26 to June 10, testimony was introduced by Southern Natural stating that the additional main line capacity proposed could be made available by the construction of parallel pipe lines, as well as by the installation of additional compressor facilities. To make the additional capacity available as soon as possible, and being unable to obtain the required pipe but able to obtain the necessary compressing equipment, Southern Natural intended to install the compressor facilities, although operating costs would be somewhat higher than for parallel pipe lines.

EMPIRE

Gas APPLIANCES *are Quality* BUILT



For

BETTER PERFORMANCE

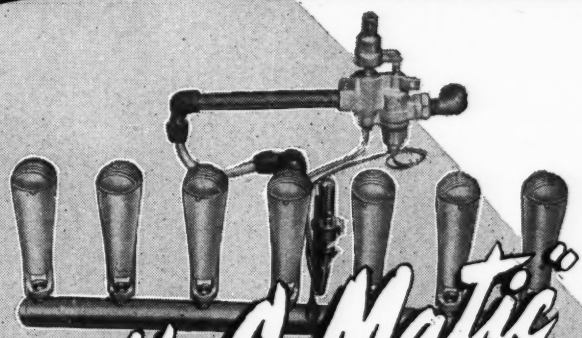
GREATER ECONOMY

GREATER CUSTOMER SATISFACTION

EMPIRE
FLOOR FURNACES

Adaptable to any type home—old or new, and to any gas supply. Vented. A. G. A. approved.

No. 25-46...25,000 BTU Input
No. 40-46...40,000 BTU Input
No. 50-46...50,000 BTU Input
No. 65-46...65,000 BTU Input



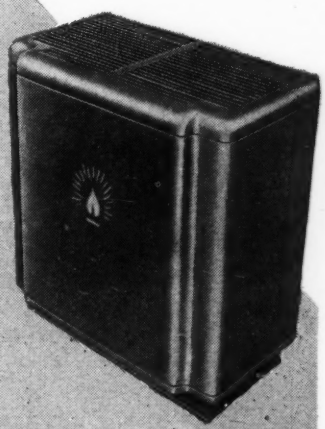
"Thrift-O-Matic" *Gas* BURNER
DEVELOPED BY EMPIRE

makes the difference!

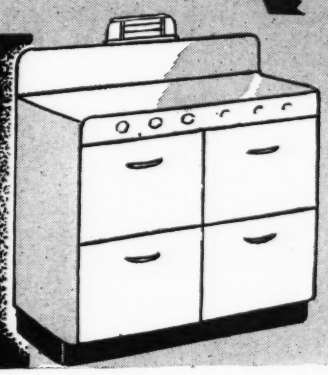
***New* EMPIRE**
CIRCULATOR HEATERS

New streamlined beauty, new efficiency and economy. Burns any type of gas. Vented. A.G.A. approved.

No. 825.....25,000 BTU Input
No. 840.....40,000 BTU Input
No. 850.....50,000 BTU Input
No. 860.....60,000 BTU Input



EMPIRE
STOVE *Company*
BELLEVILLE, ILLINOIS
MANUFACTURERS OF GAS HEATING & COOKING APPLIANCES



COMING SOON!

EMPIRE *Gas* RANGES

Watch for further announcements. It's new in engineering, new in cooking efficiency and fuel saving — and superb in streamlined beauty. Worth waiting for!

The company now has commitments for the delivery of quantities of pipe sufficient for it to construct loop lines which, with the addition of much less compressor capacity, would result in a slightly greater increase in main line capacity than would be available under its original program.

Utilities Tax Vetoed

Early last month Mayor C. Frank Whitehead of Jacksonville, Fla., vetoed two ordinances passed by the city council placing a tax upon city users of electricity, water, gas and telephone service. The bills were designed to raise about $1 million in new taxation for the city budget. Users of the above services were to pay a 10% monthly tax on bills under $500, 5% on the next $1500, and 1% on bills in excess of $2000.

Mayor Whitehead stated that he vetoed the bills for the following reasons: New industries and businesses would be discouraged from coming to Jacksonville. The measures place an additional burden on the people least able to bear such a burden—that is, married veterans, men raising large families and widows with children. A bill could be drawn which would be more equitable and would serve the same purpose through the use of a graduated tax scale.

Mineral Rights Extended

A far-reaching oil and gas decision by the U. S. Department of the Interior, which may yield between $5 and $10 million to landholders in north Louisiana alone, was announced recently in New Orleans by Harvey G. Fields, attorney. The ruling will affect more than 1 million acres in proven gas and oil reserves, and will provide an unprecedented impetus for drilling operations, Fields said.

The decision guarantees the validity of mineral right reservations contained in lands sold to the government for periods of from 25 to 40 years, and will assure well owners of title to their holdings beyond that time.

Under a Louisiana law enacted in 1942, mineral right reservations remained in force for only 10 years.

FINANCIAL

Sales Keep Climbing

GAS utility sales in therms and operating revenues of natural gas companies increased during June and July and during the 12-month periods ending with those months, according to recent reports issued by the FPC and the AGA.

Total sales of utilities to ultimate consumers in July were 1.9 billion therms, AGA states. This represents an increase of 8.2% over July, 1946. The association's index of total sales on July 31 stood at 198.8% of the 1935-39 average. For the 12 months ending July 31, 1947, total gas sales were 28.3 billion therms, an increase of 10.4% over the previous year.

Natural gas sales during July totaled 1.7 billion therms, a gain of 8.8% over July 1946. Manufactured gas sales aggregated approximately 146 million therms in July and mixed gas sales for the month were about 77.7 million therms, an increase of 1.7% and 7.1%, respectively, over July, 1946.

Operating revenues of natural gas companies reporting to the FPC amounted to $44.7 million in June, 1947, an increase of 11.1% over the same month a year ago. Gas sales to ultimate consumers in June were up 13.1% over June, 1946. Revenues from such sales increased 14.8%, amounting to $22.7 million.

For the twelve months ending June 30, 1947, gas operating revenues increased 14.9% over the total reported for the previous 12 months. Net income for the period ending in 1947 increased 20.8%.

U. S. Profited on Inch

The Big and Little Inch pipe lines "more than met expectations" from both military and economic standpoints during the war, it has been reported by the RFC. Net return to the government was about $182 million, exclusive of depreciation. This compares with a government capital investment of $145 million, which is substantially the sum for which the system was recently sold. The government also effected a large saving in oil transportation directly resulting from the $290 million difference in the cost for pipe line deliveries and the more expensive charges which would have been necessary for tank car deliveries.

SEC Okays Sales

The Securities and Exchange Commission has approved the proposal of Southern Natural Gas Co. to issue and sell to Chase National Bank, New York, and 12 other banks, pursuant to loan agreements, its promissory notes in the aggregate principal amount of $5 million and to use the proceeds to construct additions and extensions to its pipe line system. The notes will mature in two years from date of delivery and they will bear interest at the rate of 1¾% annually.

The proposed sale by Public Service Co., of Tulsa, Okla., of its gas production, transmission and distribution properties to Consolidated Gas Utilities Corp. for a base purchase price of $2,737,071 in cash, subject to closing adjustments, was also approved by the commission. Upon consummation of the sale, Lawton Corp., a wholly-owned subsidiary of Public Service, will sell its gas properties to Consolidated, following which it will distribute its assets to Public Service and dissolve. Public Service of Oklahoma is a subsidiary of Central & South West Corp.

TGT Registers Bonds

Tennessee Gas Transmission Co. has registered with the Securities and Exchange Commission $40 million of first mortgage pipe line bonds and 100,000 shares of $100 per cumulative preferred stock for expansion and other purposes. The securities will be offered by an underwriting group at prices to be filed by amendment. The interest and dividend rates also will be filed by amendment. Proceeds will be used to finance the company's construction program and to pay its $7.5 million of 1½% construction loan.

Refunds Total $24 Million

A plan for refunding nearly $24 million to natural gas consumers in Kansas, Missouri, Oklahoma and Nebraska has been presented in Topeka and approved by the Tenth U. S. Circuit Court of Appeals. Forty-three gas distributing companies serving 236 communities in the four states are involved in the refund, which became necessary when a new rate schedule went into effect last July 3 covering a period from Sept. 1, 1942, to May 1, 1947. Cities Service Gas Co. was unsuccessful in its attempt to amend the order relative to the rates.

Ohio Approves Note Issue

As part of its financing program for additional pipe line facilities from the Texas fields through Ohio, Panhandle Eastern Pipe Line Co. has asked the Ohio Utilities Commission to approve a $10 million issue of unsecured promissory notes bearing 1.875% interest. The commission indicated that formal approval would be given at once.

Panhandle already has received FPC approval of the project.

Symbol of Service

Columbia Gas System, operating more than 30,000 miles of gas transmission and distribution lines, serves nearly 1,000,000 homes, industries and commercial enterprises in New York, Pennsylvania, Ohio, Virginia, West Virginia and Kentucky. In addition, The System supplies gas at wholesale to other utilities including those serving Washington, D. C., Cincinnati and Dayton, Ohio and their territories.

COLUMBIA GAS SYSTEM

is comprised of

The Ohio Fuel Gas Company

The Manufacturers Light and Heat Company

United Fuel Gas Company

and other Operating Companies

Columbia Gas & Electric Corporation
(*the parent company*)

Columbia Engineering Corporation
(*the service company*)

MISCELLANY

Chemicals Sale

U.S.I. to be outlet for Fischer-Tropsch products

A long-term contract has been announced between U. S. Industrial Chemicals, Inc., and Stanolind Oil & Gas Co. for the sale by U.S.I. of all water soluble oxygenated chemicals to be produced at the first two synthetic gasoline and oil plants using the much-publicized Fischer-Tropsch process. The announcement is an event of importance to all chemical-consuming industries.

The plants are being undertaken by Stanolind and Carthage Hydrocol Corp. Plans also call for erection of U.S.I. plants at the two locations, for production of other products using some of the Fischer-Tropsch chemicals as raw materials.

It is estimated the chemicals produced from these Fischer-Tropsch plants may exceed a total of 300 million lb. annually, and include ethyl alcohol, methyl alcohol, normal propyl alcohol, normal butyl alcohol, normal amyl alcohol, acetone, methyl ethyl ketone, acetic acid, propionic acid, butyric acid, acetaldehyde, propionaldehyde and butyraldehyde. In addition, U.S.I. will produce esters, higher alcohols, and other chemicals from some of the primary products, adding substantially to the number of products made available by this development.

The effect on the chemical industry of large quantities of these important organic chemicals from this new basic process is obvious.

It will mean a dependable new source of these much-needed chemicals at prices competitive with those from any other synthetic or fermentation process. It will open new fields by making available for the first time large quantities of such products as normal propyl alcohol, normal amyl alcohol, propionic acid and butyric acid, and it will stimulate development of new solvents, plasticizers, pharmaceuticals, plastics, and a host of other chemical products.

The announcement called attention to the fact that all of the alcohols, acids, ketones and aldehydes produced by this new process are normal compounds. These normal compounds are generally preferred, but heretofore only the lower members of the series have been available in quantity at reasonable prices.

U.S.I. is in a favorable position to handle these products and some important contributions will be made by use of processes developed by the firm for conversion of some of the primary products into other chemicals.

Diesel Fuel-Cost Saver

Ralph L. Boyer, vice president and chief engineer, Cooper-Bessemer Corp., has announced an engineering achievement which reduces by as much as 72% the fuel cost of engines burning diesel oil and natural gas and which, it is said, makes the gas-diesel the most efficient power unit ever created by man. The development is expected to increase gas-diesel acceptance by municipal power plants, sewage plants and many industrial power operations. Percentage of savings possible will range from 10 to 72% under current costs, depending upon the type of equipment now in use.

Results achieved by Cooper-Bessemer engineers have been compiled on a 1440-hp gas-diesel installation at Cherokee, Okla. The unit is currently saving taxpayers of that community $33,214 a year compared with the fuel cost of a diesel oil-burning engine; is $1394 cheaper to operate than original gas-diesels; and is $3174 cheaper to operate than a spark-ignited gas engine.

Annual Reports Winners

Seattle Gas Co. and Dresser Industries, Inc., have received recognition from "Financial World" for outstanding 1946 annual reports. Seattle Gas was presented with the Highest Merit Award, a certification that its 1946 financial statement was judged as among the most modern from the standpoint of content, typography and format of the 1750 reports examined. The Seattle company is one of five candidates for the next highest award —the Oscar of Industry. The other four are Brooklyn Union Gas Co., Hartford Gas Co., Suburban Propane Gas Corp. and Washington Gas Light Co.

For the second consecutive year Dresser Industries has been awarded an Oscar of Industry for the best annual report in its industry. Carrier Corp. and Minneapolis-Honeywell Regulator Co. rated second and third in this industrial classification.

Corporations winning bronze Oscars of Industry are still in the running for Best of All Industry awards, silver and gold trophies to be presented at the annual report awards banquet in New York Oct. 10.

EMPLOYEE RELATIONS

Free Blood Tests Given

A voluntary program whereby employees of Consolidated Edison Co. of New York, Inc., may have their blood typed and Rh factor determined without any fee or inconvenience has been announced by the Mutual Aid Society of the company. The project is believed to be the first of its kind ever attempted on such a large scale by any industrial group. It is scheduled to commence Oct. 14, with completion anticipated by the end of the year. More than 25,000 men and women will have been typed.

The program will be conducted during regular working hours by mobile units comprising technicians of the Blood Bank of Queens County, Inc. Each individual will receive an identification card bearing his or her blood type and its Rh factor, as well as instructions on how blood may be obtained in case of emergency through the Mutual Aid Society's blood bank.

Perfect Safety Record

Employees of The Manufacturers Light and Heat Co. closed their annual August "No Accident" campaign without a single injury during the month to cause time lost from work. This accomplishment was duplicated in all the affiliated gas companies making up the Pittsburgh Group of the Columbia Gas System. More than 2500 men and women worked safely for approximately 500,000 hours during the drive. Company management stated that "the success of the campaign was entirely due to the excellent spirit of cooperation evidenced every day by all employees."

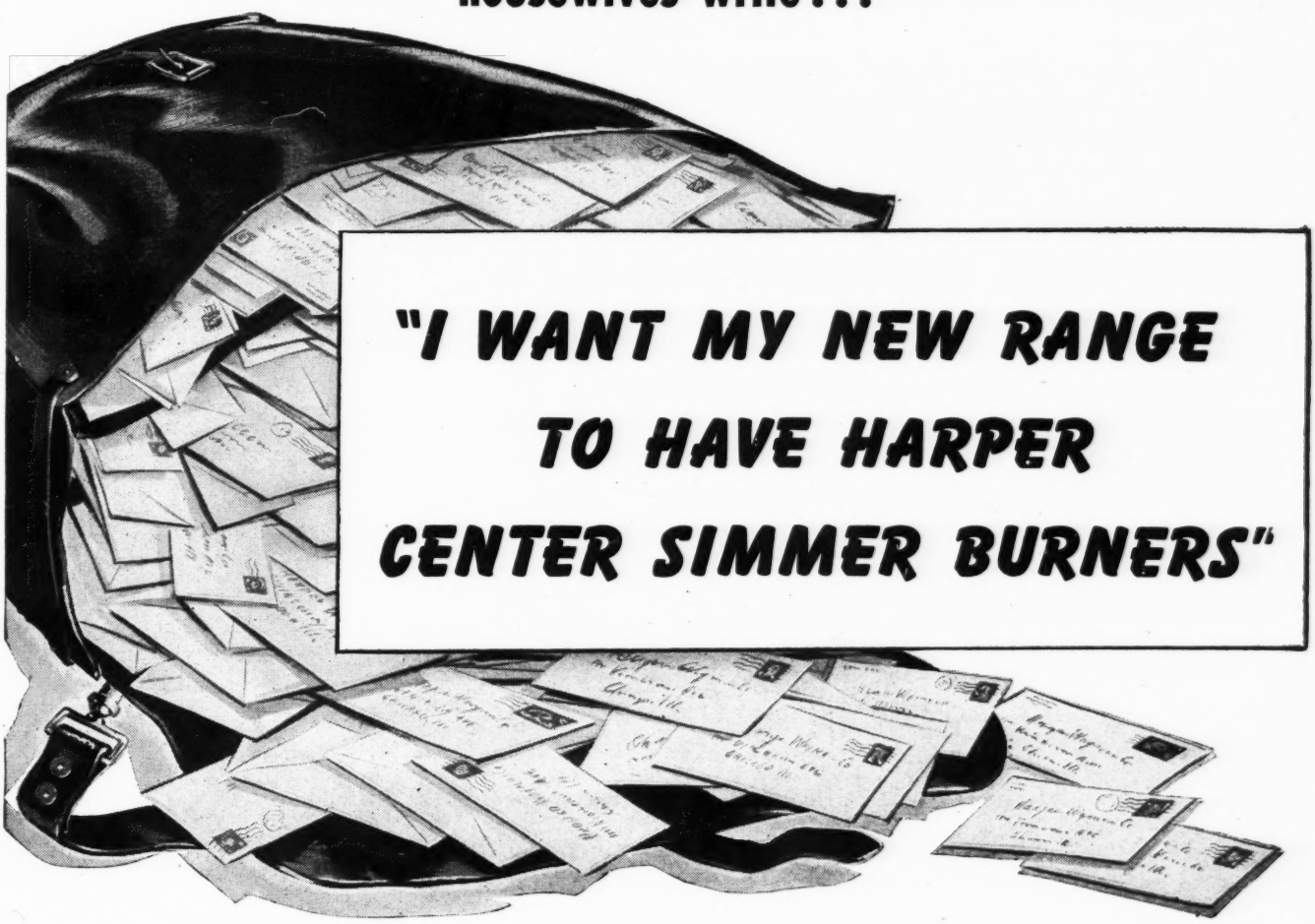
Indoctrination Pamphlet

The need for giving new employees something more tangible than oral explanation about their job and the company for which they will work has resulted in the issuance of a 48-page book, "The People of Union Electric," by the Union Electric System of Missouri, Illinois and Iowa. Included are sections on company history, future plans, health and security program, social activities, and general information.

Retires With 47-Year Record

Henry J. Battel retired from the Iroquois Gas Corp., Buffalo, N. Y., Sept. 1 after setting a seniority record with the company of 47 years of continuous service. Working his way up from helper to paymaster, Battel has seen the firm's list of consumers grow from 22,000 to about 250,000.

From Muleshoe, Texas, to Big Fork, Minnesota housewives write...

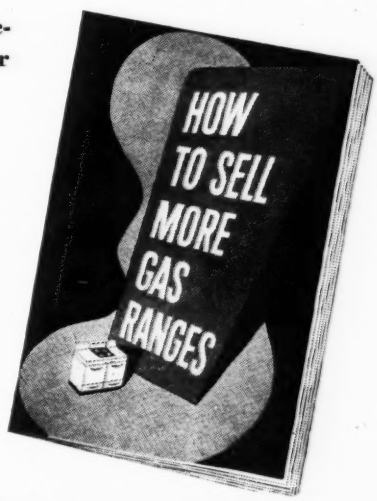


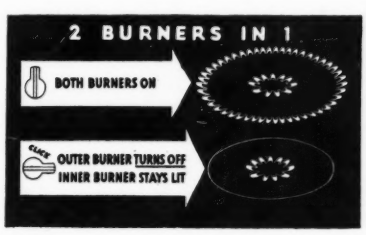
"I WANT MY NEW RANGE TO HAVE HARPER CENTER SIMMER BURNERS"

There is a fast-growing preference on the part of American housewives for ranges equipped with the new, improved Harper Center Simmer top burner.

Part of this demand may be traced to the educational program of advertising now appearing regularly in national magazines which are read by more than 21,500,000 women. Far more significant, however, is the "word-of-mouth" advertising coming from delighted women owning Harper equipped ranges.

Increase your range sales with our FREE booklet, "How to Sell More Gas Ranges." This handy manual contains a series of quick, convincing sales floor demonstrations that graphically illustrate the superiority of the Harper Center Simmer Burner. Send for copies for your salesmen. Harper-Wyman Company, 8565 Vincennes Avenue, Chicago 20, Illinois.





The Harper Center Simmer Burner operates on the unique principle of "2 burners in 1"... a STARTING BURNER for frying and to start foods boiling, plus a small, economical COOKING BURNER, to maintain the cooking ... both controlled by the same handle. It is subject to finer gradations of low heats—greater control and economy—than any other top burner made.

HARPER CENTER SIMMER BURNERS

"... Holds the Lines for Gas"

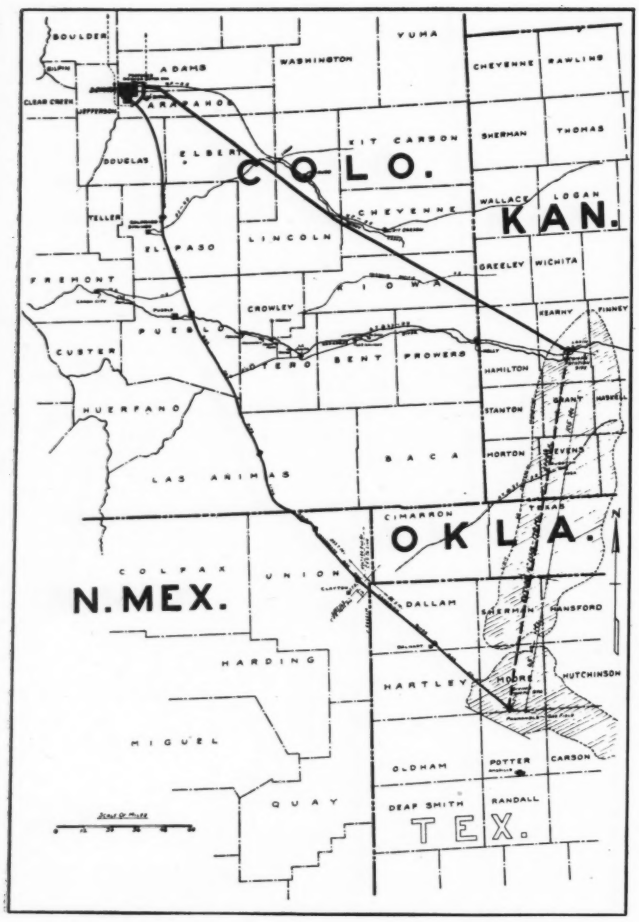
HARPER CENTER SIMMER

NEW LINE FROM HUGOTON FIELD

To Shoot 236 MMcf into Denver

By PRESTON PARKS

Colorado Interstate Gas Co.,
Colorado Springs



The Colorado Interstate Gas Co. has completed the new Lakin, Kan., to Denver pipe line, shown above, that insures uninterrupted service to its market areas.

THE Colorado Interstate Gas Co. and the Canadian River Gas Co. have been operating since 1928 a 340-mile, 20-in. and 22-in. natural gas pipe line serving a territory between Amarillo, Texas, and Denver, Colo. The flowing capacity of this line has been increased from time to time reaching a maximum during the winter of 1946-47 of 140 MMcf per day. Studies that were completed early in 1946 clearly indicated the need for a new pipe line to Denver for service during the winter of 1947-48. Further studies resulted in a decision to go ahead with this project, namely: the construction of a 20-in. high pressure pipe line from the Hugoton gas field to Denver together with compressor station, dehydration plant, and field gathering lines.

The decision to proceed with this project was reached in April of 1946, and since it was necessary to have this project completed for the winter of 1947-48, time was one of the most vital considerations. Orders for pipe, compressor units and other major materials were placed immediately. Contracts were awarded covering the detailed design and construction of the pipe line, compressor station, dehydration plant, and field lines. Gas purchase contracts were signed with producers in the Hugoton field. Approval of this project by the Federal Power Commission was granted on May 23, 1947. As a result of previous planning, pipe, and other materials were on hand, the construction equipment and personnel were in the field, and construction of the pipe line and compressor station started immediately.

The Hugoton gas field rather than the Panhandle field was chosen as a source of supply because:

(1) It is nearer to Denver, requiring less pipe—an important consideration when pipe is so difficult to obtain.

(2) The location is far better pipe line country allowing some saving in construction costs.

(3) It afforded an advantage in that it increased connected gas reserves.

(4) It serves to insure the Denver and other market areas against possible interruption of service due to washouts. Localized heavy rainfall along the Panhandle-to-Denver pipe line has caused pipe line washouts at quite unexpected points. Choosing a location for the new pipe line at considerable distance from the present one prevented exposure of both lines to the possibility of washouts from the same flash flood.

For reasons of desirable future flowing capacities and giving consideration to other economic aspects and materials that were available, the pipe selected for this line was 20-in. O.D. x 5/16-in. wall thickness, electric-welded and suitable for operating pressures of 900 psig. The pipe line is approximately 230 miles in length from the field compressor station to a crossover station just east of Denver. From this crossover station the pipe line continues for 20 miles to meter stations on both the north and south sides of the city. The pipe line is of welded construction throughout its entire length. Twenty-inch mainline plug valve assemblies are welded into the pipe line at approximately 10-mile intervals. All of the pipe is protected with one coat of primer and a coat (3/32-in.) of coal tar pipe line enamel and is wrapped with either asbestos felt or fiberglass.

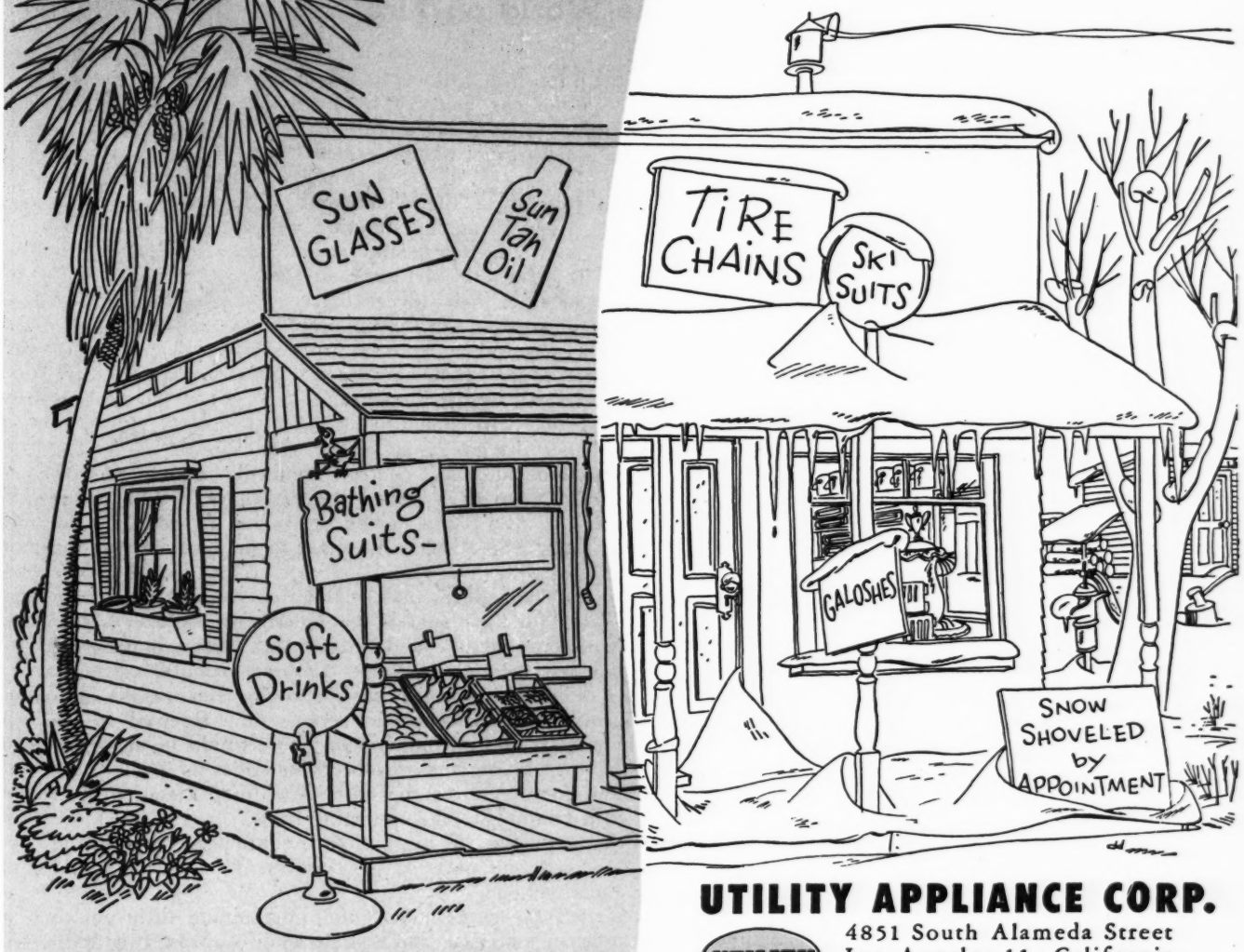
The crossover station mentioned above is designed so that gas may flow through it in either direction, permitting gas from the Hugoton line to flow to the south Denver meter station, or permitting gas from the Panhandle line to flow to the north Denver meter station. The direction of flow will depend upon the respective pipe line pressures and will be automatic in operation.

236 MMcf Capacity

This pipe line will have an initial flowing capacity of 100 MMcf per day and an ultimate flowing capacity of 236 MMcf per day. Engineering

No Seasonal Slumps

Dealers who handle the complete Utility line have an active business all year — no seasonal slumps — profit every month. Crews keep busy and the cash register jingles . . . with spring and summer sales of air coolers and fans . . . fall and winter business in gas-fired heating equipment. Write for complete information and prices.



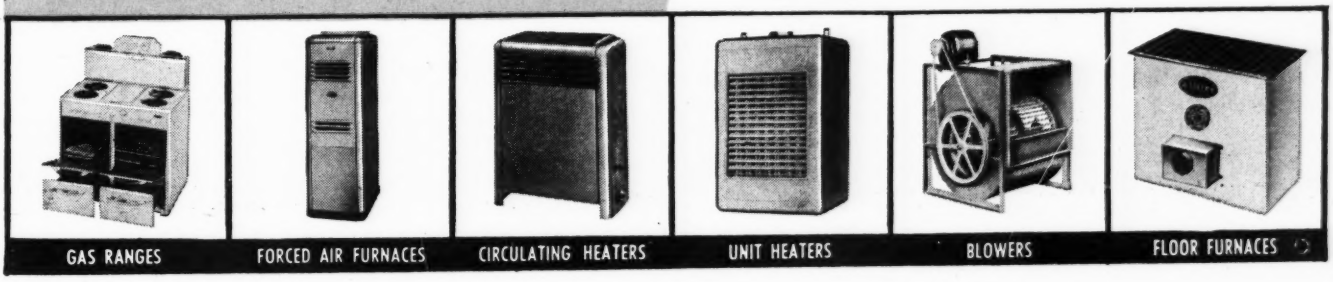
UTILITY APPLIANCE CORP.

UTILITY

4851 South Alameda Street
Los Angeles 11, California

DIVISIONS

UTILITY FAN CORPORATION
GAFFERS & SATTLER • OCCIDENTAL STOVE CO.



supervision of the construction and design of this line is being performed by Ford, Bacon & Davis Construction Corp. of New York. Actual construction of the 230 miles of 20-in. pipe line by the J. R. Horrigan Construction Co. of Houston was completed in 120 days elapsed time from start to finish. Two complete spreads were in the field and the line was laid at an overall rate of approximately two miles per day.

Seven Compressors

The compressor station at Lakin, Kan., was designed and is being constructed by the Stearns-Roger Manufacturing Co. of Denver. Plans call for the installation of seven 1200-hp Clark Angle single stage compressors. The compressors will be operated at a suction pressure of 225 psig. Considering one unit as a spare the station will deliver 100 MMcf per day at a discharge pressure of 710 psig. Other units at the compressor station include an auxiliary building with three 410-hp CCG Worthington gas engine-driven generators, machine shop, warehouse, garage, office, atmospheric cooling tower with coil shed for gas cooling and cold jacket water circuit, fin fan cooling unit for hot jacket water circuit, and other miscellaneous equipment and buildings. All pipe and equipment at the station is designed for maximum operating pressures of 900 psig.

The dehydration plant located on the Lakin compressor station site was also designed and is being constructed by the Stearns-Roger Mfg. Co. of Denver. The plant is a two-unit, Fluorite type dehydration process. Each unit will be alternately on the line for a period of eight hours and then regenerated. The plant is designed for maximum working pressures of 900 psig. Other major construction at the Lakin site includes a village consisting of 20 residences, and a boarding house which is being built by the Abrahamson Construction Co. of Colorado Springs.

Gathering Lines

Approximately 170 miles of gathering lines ranging in pipe sizes from 4 in. to 20 in. are being constructed by midwestern constructors. Approximately 100 wells are to be connected for services during the winter of 1947-48. In all cases gas is metered and purchased at the well head.

Communication facilities will include a telephone line, fixed and mobile radio units, and telemetering. The telephone line will as nearly as possible parallel the pipe line and will be connected to present telephone facilities at Denver. A fixed radio station will be located at the Lakin compressor station site, and several mobile radio units will be installed in company automobiles. Line pressures at Lakin and pressures and deliveries at Denver will be telemetered and recorded at the company's Colorado Springs office.

This entire project was scheduled for completion by Oct. 1, at a cost of about $12.5 million. Considering the scarcity of materials and the time element involved, a great deal of credit is due to everyone concerned with completing this project.

Miss Flame Wants to Set the World on Fire

"MISS Flame," the neat little lady who represented the gas industry in the picture book, "History of Gas," has ambitions to become the national symbol of the service of gas.

The Promotion Bureau of the American Gas Association is planning an investigation early this fall to find out how many gas companies would like to use Miss Flame, in different fetching poses, in their advertising.

If there is sufficient interest, the Promotion Bureau will start a mat service and an art reproduction service, under which perhaps a dozen poses of the girl will be distributed each month. For instance, she will be shown turning on a simmer burner of a gas range, or she will be adjusting various automatic controls. She will be pictured with a Servel refrigerator, or with a water heater. There will be some "just plain pictures" of Miss Flame herself delivering a speech, for the top of institutional ads, where she will appear to be speaking for the company.

The Promotion Bureau believes that local utilities are plagued by a lack of good art work for their ads. If the advertising manager has in his desk a variety of reproductions and mats of Miss Flame, in different poses, he can pick out the one he needs for his particular purpose.

Under the plan being considered by the Promotion Bureau, the individual utilities would pay for whatever service they received in the way of Miss Flame mats and reproductions. There would be an agreement between the association and member companies to protect the Miss Flame copyright and cover the cost. The Miss Flame project would thus be on a non-profit self-supporting basis.

At present there are some 20 local picture characters representing the gas industry in different parts of the country. Miss Flame would like to become the chief one.

The AGA designed her as a modern up-to-the-minute little gal to emphasize the modernity of gas. She wears a maid's apron, thus indicating she's definitely the servant of the housewife. Clean and glowing, she exudes a willingness to serve typical of the ideal maid-of-all-jobs in the house.

The picture story book, "History of Gas," in which Miss Flame was a combination narrator-heroine, aimed at getting gas education into the schools. This was to fight the prevalent idea among schoolchildren that electricity and oil are the modern fuels and gas something outmoded. The book has proved popular with school teachers for use in their classes, and it is planned to make her the heroine of additional picture books telling more of the story of gas.

Meanwhile, this fall the Promotion Bureau is sending out questionnaires to determine how far the industry wants to go in making Miss Flame their official advertising spokesman, from coast to coast.

Drying Enamel on Metal Products by Indirect Heat With Dowtherm Liquid

Reprinted from Pacific Coast Gas Utilization Data Bulletin 115, July 1947.

The Problem. Fraser & Johnston Co. of San Francisco manufactures a complete line of hot air heating furnaces —floor furnaces, gravity and blower type central heating furnaces. In addition, they also manufacture deep freeze storage cabinets.

The products are finished in color with synthetic enamel, the central heating furnaces being green wrinkle finish, the deep freeze storage units a smooth white finish.

It was necessary to install a drying oven having comparatively high temperatures ranging from 265° to 325° F. to meet the drying specifications. Because of the highly explosive nature of the volatiles used in the enamels, a direct-fired heating unit was considered too hazardous to operate. In addition to this, an oven which could be controlled automatically and accurately was desired.

The Equipment. To meet these specifications and provide flexibility of operation, a drying oven heated indirectly by means of Dowtherm liquid was installed. The oven measures approximately 10 ft. high x 10 ft. wide, x 20 ft. long, and is made of sheet steel with walls 8 in. thick, insulated with spun glass. The oven is divided into two compartments, one operating at a temperature of 265° to 275°, the other at a temperature of 300° to 325° F. The oven doors are electrically operated.

The heating medium is a McKee No. 20-3A Dowtherm Vaporizer, having a capacity of 1450 lb. of liquid which at an operating pressure of 50 lb. provides a liquid temperature of 640° F.

Operation. The heated Dowtherm liquid circulates through two heat exchangers located atop the oven. These heat exchangers are rectangular in shape, each containing 108 1¼-in. O. D. tubes arranged in 6 rows of 18 tubes.

Large air circulating fans force air through the spaces surrounding the tubes, thence through ducts into the ovens. There are several ducts in each compartment. These ducts are located in each oven compartment on one side only and exhaust near the floor line. Suitable openings are provided on the opposite sides for venting and recirculation. New filtered air is put into the system through a 24 x 15-in. opening at the intake of the heat exchanger. A large portion of the air exhausted from the ovens which is contaminated with paint vapors is vented outside the building. The temperature range in each compartment is controlled by means of vacuum-operated shutters in the heat exchangers. The drying time is ½ hour in the case of the central heating furnaces which require the lower temperature range. Drying time for the deep freeze storage units is 1½ hours. All products are thoroughly cleaned in a gas-fired degreaser before being coated with enamel.

Results. The operation of the drying equipment is very satisfactory and operates with a minium of attention. A uniform product is produced with a minimum of rejects.

FRED C. DIETRICH
Pacific Gas & Electric Co.

Tailored Confort Heating System Using Floor Panels

Reprinted from Pacific Coast Gas Utilization Data Bulletin 114.

Problem. To heat the show rooms, offices, parts and maintenance departments of the Bill Wood Automobile Agency, Oakland, Calif.

Solution. Panel heating was decided upon as the method best adapted to this building. The concrete floor was used as the panel and hot water in copper pipes as the heating medium. The warm sections were so planned that only working areas are heated. (See *Fig. 1.*) The water is heated by three No. 189 Day and Night Heatwave water heaters connected in parallel. Each unit has a recovery rate of 189 gal. of water per hour and consumes 135,000 Btu's per hour of natural gas. Water is circulated by means of a pump on the return system. This unit has a water capacity of 35 gpm against a 35-ft. head. A ½-hp. motor drives it. There are 21 circuits fed from three manifolds, one of five, one of six, and one of 10 coils. The manifolds, heaters and individual coils are so valved that any one or all of them can be isolated from the system. (See *Fig. 2* for layout.) A General Controls B-60-18 thermopile is connected in series with an aquastat in each heater to control water temperature. A room thermostat controls the pump. All coils are made of ⅝-in. O.D. copper tubing and streamline fittings are used throughout.

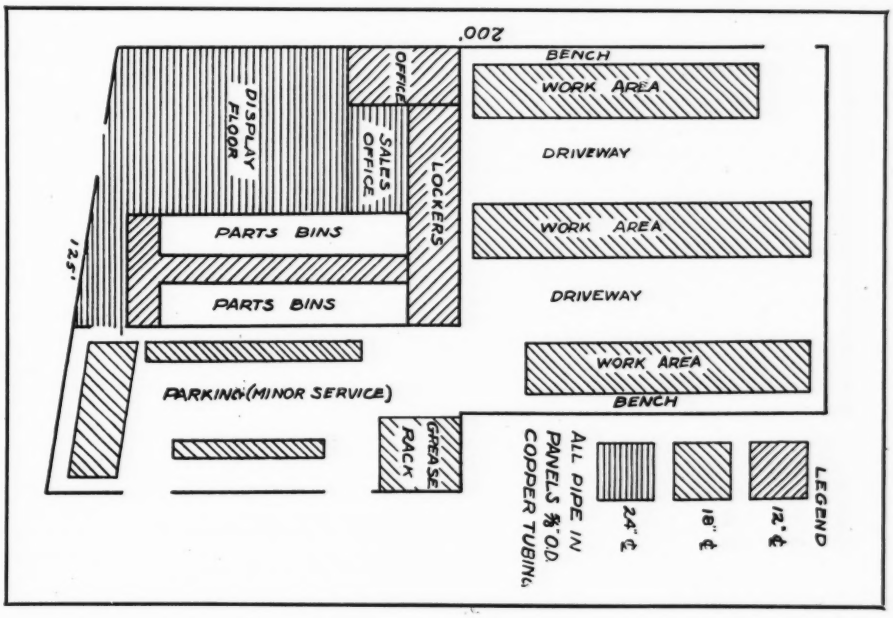


Fig. 2. Piping layout, which was planned to give heat only to working sections.

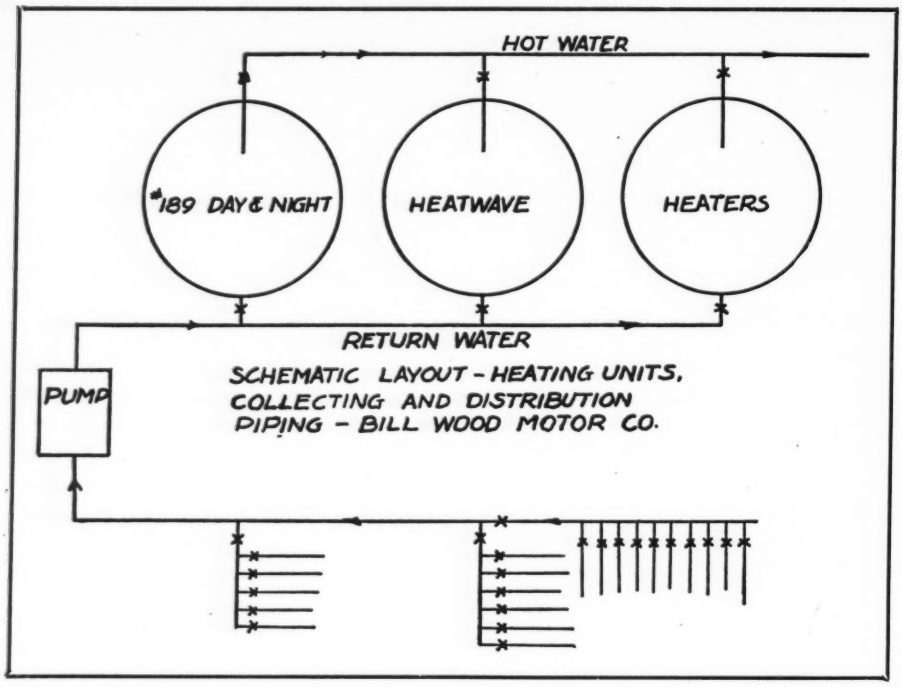


Fig. 2. Schematic drawing of layout. Each unit can be isolated from system.

The seperate sections are not automatically controlled, but this condition could easily be accomplished by installing suitable water valves on different parts of the system.

Results. The men in the shop have been well pleased. They can now work under a car, either on the floor or from a pit or a lift, and be perfectly comfortable. Panel temperatures are maintained at about 80° F in the shop by water temperature control and proper valving. Lost time from colds and other winter ailments have been greatly reduced. The office force and parts department force no longer complain of cold feet.

Conclusions. Although panel heating is here discussed as it applies to an automobile agency, it can readily be tailored to fit any type of commercial or industrial building. Results in the area have been uniformly satisfactory in offices, warehouses, and heavy industries.

From information available it appears that only 50% to 75% as much heat is necessary with this type of installation as with other types.

A. J. PERRY, JR.
Pacific Gas & Electric Co.

Traveling Circular Tunnel Kiln For Decorative Enamel Ware

Reprinted from Pacific Coast Gas Association Gas Utilization Data Bulletin 117.

Introduction. A kiln built for the firing of gas heater radiants has proved equally well suited for decorative ceramic ware. A circular traveling tunnel kiln of this type lends itself exceptionally well to continuous heating operations in which temperature zones must be maintained and where uniformity of product is desired. The speed at which the circular conveyor rotates can be readily adjusted for the operating conditions desired. This kiln is designed for continuous operation, and is loaded and unloaded at the same point.

Description of Equipment. The kiln is built circular with an inside diameter of 20 ft. The conveyor has a width of 20 in. which allows a clearance of approximately 2 in. between the conveyor and the inside of the kiln. The height from top of refractory bed to inside of tunnel roof is 32 in. The base of the bed is constructed from heavy steel angle irons. These angle irons support the refractory rotating bed and also act as tracks.

The traveling bed rolls on flanged idling wheels mounted on stationary axles at eight points on the circle. The bed is rotated mechanically by means of hydraulically-actuated pistons placed at four points on the inside of the track.

For firing radiants, the equipment is set to make a complete revolution in 11 hours.

Length of Warming Zone .....20 ft.
Length of Firing Zone .....20 ft.
Length of Cooling Zone .....20 ft.
Length of Loading Zone ..... 8 ft.

Burner Equipment. Ten 1¼-in. Nemec atmospheric-type burners (5 burners on the inside, 5 on the outside—staggered) operates on 3 lb. gas pressure. The burners fire under the ware, not directly on it.

Operating Data. (For 3 x 9 x 1 in. gas heater radiants):

Time required for complete revolution of bed.....11 hrs.
Average gas consumed per hour (1080 Btu).....1100 cu. ft.
Gas consumed per revolution .....12,100 cu. ft.
Speed of bed travel (at mean circumference).....6.18 ft./hr.
Radiants fired per revolution 2125
Average gas consumed per radiant 5.7 cu. ft.
Cost of gas per radiant.....2 cents
Temperature in firing zone.....2080°-2100° F.
Time required to bring heating zone to 2100°.....2¼ hrs.

By turning burners on when loading operation starts, firing zone will be up to temperatures before the material reaches this zone.

Conclusion. The average cost of fuel per radiant has been reduced from .42 cents to .2 cents since the circular kiln has been installed.

This circular type tunnel kiln offers convenience in loading and unloading, uniformity of product, and economy of operation.

Modifications of this design can readily be adapted to heat treating and ceramic operations.

E. K. SNIDECOR
Southern California Gas Co.

Using Natural Gas In Almond Drying

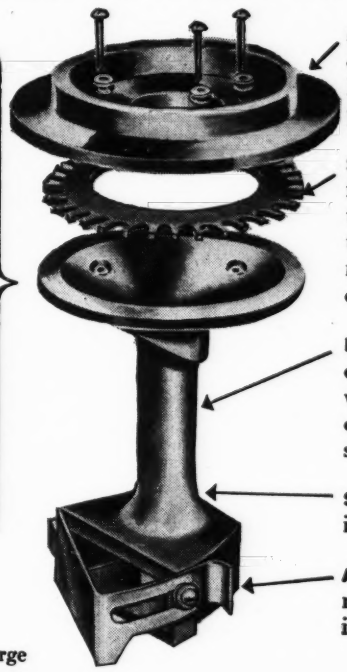
Reprinted from Pacific Coast Gas Association Gas Utilization Data Bulletin 116.

In the United States, almonds as a commercial crop are grown only in California. The nut is enclosed in a tough, pithy hull. After the crop has been knocked, this hull is removed by a machine, known as a huller, leaving

The RHEEM High Velocity Grid Burner

FOR THE SERIES 40 LARGE and THE SERIES 50 BOOSTER HEATERS

This burner has simplified, proven engineering features which assure maximum efficiency and trouble-free performance. To help service men make routine adjustments, the operation of this burner and removal methods are described in a clear, detailed, instruction manual from which the facts below are taken. Copies are available . . . just mail the coupon below.



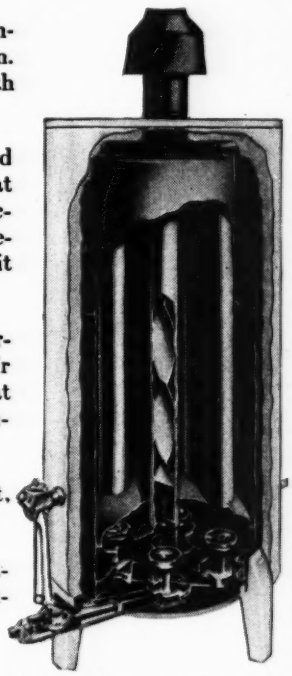
CUPPED BURNER TOP—Designed to catch condensation during initial high fire operation. Prevents moisture from interfering with perfect combustion.

STAINLESS STEEL GRID—Specially designed for each type of gas. Grids are installed at the factory for use with natural, manufactured, mixed, or liquid petroleum gas. Removal of three non ferrous bolts makes it easy to take apart for cleaning.

HIGH-VELOCITY MIXING CHAMBER—Thoroughly mixes a high ratio of primary air with the gas, for the greatest possible heat output with the least possible gas consumption.

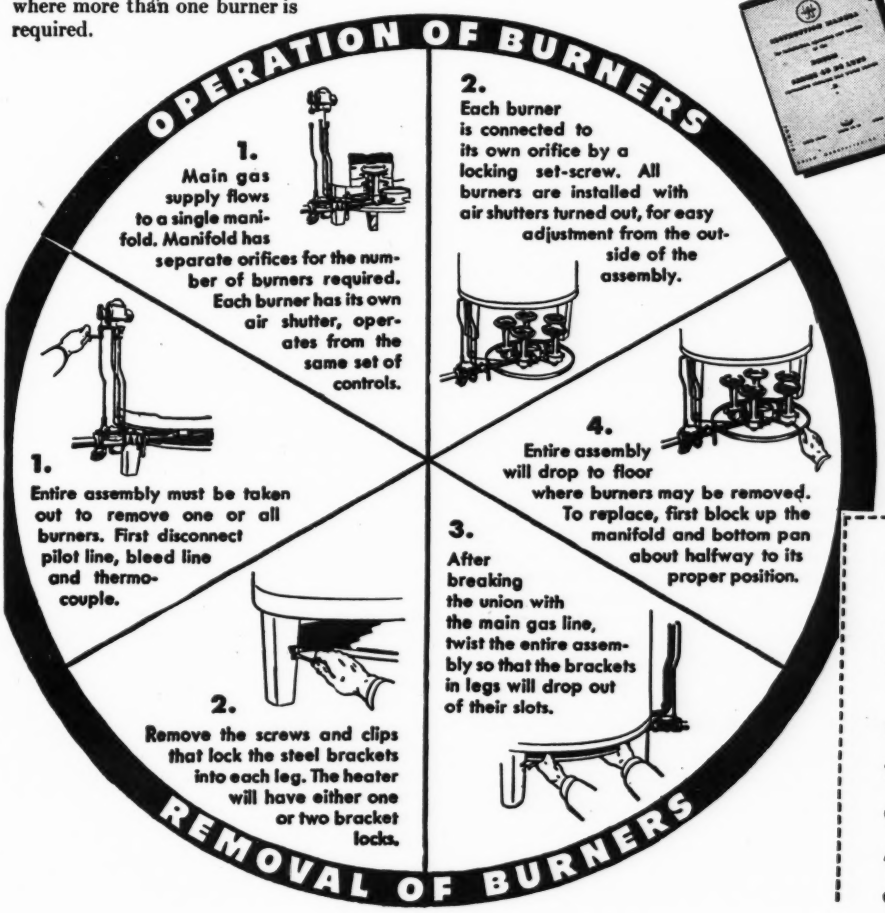
STURDY CAST IRON BODY—Corrosion resistant, it will give years of trouble-free service.

AIR SHUTTER—Permits correct air adjustment and provides a positive means of locking the proper setting.



High-Velocity Grid Burner

For use on the Series 40 Large and Series 50 Booster Heaters, where more than one burner is required.


OPERATION OF BURNERS
1.
Main gas supply flows to a single manifold. Manifold has separate orifices for the number of burners required. Each burner has its own air shutter, operates from the same set of controls.
2.
Each burner is connected to its own orifice by a locking set-screw. All burners are installed with air shutters turned out, for easy adjustment from the outside of the assembly.
REMOVAL OF BURNERS
1.
Entire assembly must be taken out to remove one or all burners. First disconnect pilot line, bleed line and thermocouple.
2.
Remove the screws and clips that lock the steel brackets into each leg. The heater will have either one or two bracket locks.
3.
After breaking the union with the main gas line, twist the entire assembly so that the brackets in legs will drop out of their slots.
4.
Entire assembly will drop to floor where burners may be removed. To replace, first block up the manifold and bottom pan about halfway to its proper position.

Complete data for the operation and servicing of the Rheem High Velocity Grid Burner are available in attractive, clearly illustrated manuals. If your service men are acquainted with this information, it may save them time and labor in the field. Just indicate the number of copies you need and mail this coupon.

Rheem

All gas appliances are approved by The American Gas Association

RHEEM, Dept. R-D11
570 Lexington Avenue, New York 22, N. Y.

Please send me.....copies of your Instruction Manuals on the Rheem Series 40-L and Series 50 Water Heaters.

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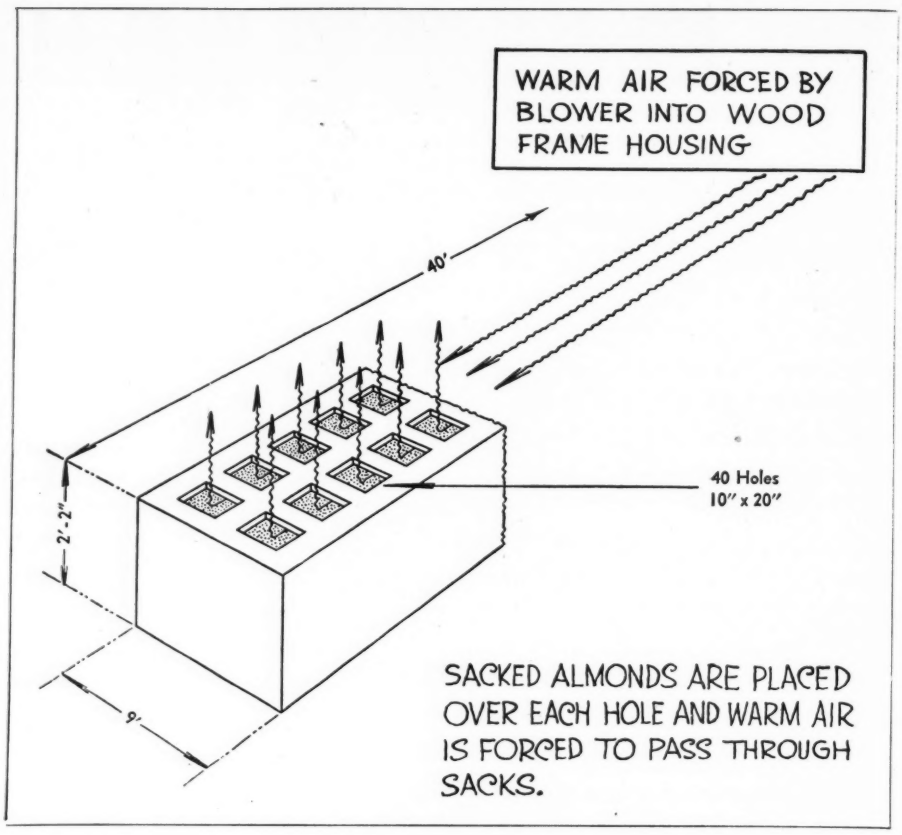
the nut in a "green" moist state. The conventional method of drying is to spread the green nuts on trays and place these trays in a field for several days in the sun. The trays are then gathered and the nuts packed.

Equipment and Operation. Charles Summy, a large grower of Sutter, Calif., decided the labor costs and time losses of this method were too costly. He designed a drier, in cooperation with the Pacific Gas & Electric Co., that has been very successful. A tunnel was constructed of tongue and groove 2 ft. 2 in. high, 9 ft. wide, and 40 ft. long. Holes were cut in the top just large enough to permit a sack of almonds to be placed on it without falling through. Air is forced through this tunnel from a fan with 4-ft. 4-in. blades driven by a 7½-hp motor. A direct-fired air heater is used to heat the air and temperature is controlled at 123° F, maximum. This is extremely critical as the oil in the almonds breaks down at temperatures only slightly in excess of this. Natural gas is used for fuel.

In this new method, the almonds are sacked while still green at the huller, and the sacks are placed over the holes in the tunnel. The warm air is forced through the sacks and the almonds are dried uniformly and rapidly.

Results. Mr. Summy is well pleased with the results and states that his direct drying costs have dropped from $3 per ton using the old method to $1 per ton with his gas-fired tunnel. An indirect saving, he says, is also accomplished with the new system. Almonds are currently worth from $20 to $35 per sack and a great many sacks were formerly lost to thieves; now all the processing is done indoors and the valuable crop is kept under lock and key.

It appears that other types of agricultural drying can be accomplished by this method; e.g., rice.


WARM AIR FORCED BY BLOWER INTO WOOD FRAME HOUSING
40'
40 Holes 10" x 20"
2'-2"
9'
SACKED ALMONDS ARE PLACED OVER EACH HOLE AND WARM AIR IS FORCED TO PASS THROUGH SACKS.

FRED N. KENYON
Pacific Gas & Electric Co.

Bureau of Mines Obtains German Equipment

Several pieces of massive German industrial equipment employed during the war in the production of synthetic liquid fuels for the Nazi air and ground forces have been brought to this country for examination by the Bureau of Mines, Thos. H. Miller, Acting Bureau Director, announced recently.

This equipment and sample lots of German-made catalytic materials have been consigned to the Missouri Ordnance Works near Louisiana, Mo., which now is being converted by the bureau to a synthetic fuels demonstration plant for obtaining oil and gasoline from coal.

The shipment included a giant hydrogenation-process converter weighing 130 tons, reportedly the heaviest single piece of equipment ever to be moved through the port of New Orleans. Sixty feet long and cylindrical in form, with a maximum diameter of 7 ft., the converter was unloaded by removing all standing rigging on the after starboard side to make way for marine derricks which were used instead of the lighter ship's gear. A special heavy-duty flat car—one of only six such rail cars in the United States—had to be moved to New Orleans from Chicago to carry the converter to Missouri.

Other bulky equipment to be examined in detail and used as a guide in preparing American designs includes a 10 x 18 ft. gas synthesis process converter and a 4 x 60 ft. "wickelofen" type heat exchanger, each weighing 60 tons; two 6 x 30 ft. coal paste injectors weighing 30 tons each; and a 3 x 50 ft. hairpin bend from a paste preheater weighing 7 tons.

A Linde-Frankl oxygen plant unit, with a capacity of 25,000 cu. ft. of oxygen per hour, also has been received and will be reassembled at Louisiana, Mo., for use in the bureau's synthetic fuels experiments. Other equipment received included a DeLaval centrifuge and special purpose valves, fittings, lens gaskets, and instruments.

Some 580 drums containing various types of hydrogenation-process catalysts and several additional drums of vapor-phase hydrogenation catalyst were obtained to determine the merits of the German-made catalysts in processing American coals. Catalysts are needed to accelerate the process reactions.

Construction of part of Tennessee Gas Transmission Co.'s cross-country loop pipe line was halted Sept. 4 after a dispute over a right of way north of Monroe, La., resulted in the arrest of eight members of a clearing gang on charges of trespassing. The men were released on $50 bond each, pending action by Asst. Dist. Atty. H. S. Parker, who indicated that disposition of their cases would depend on settlement of the issue of the rights of way.

The men were taken into custody while cutting timber on the property of Mose Bayles, who swore out the warrants. According to the gas company, the men were legally engaged in work preparatory to laying another conduit adjacent to one installed previously with Bayles' consent. The landowner, however, charged that no permission was obtained for the second line, despite the fact that it would lie along the right of way already granted.

The arrested men were all employed by Horrigan Bros. of Houston, a contracting firm assigned to clear the various rights of way and put in the pipe.

"Workability Index" Provides Data For Fireclay Refractories Tests

DURING the past two decades, fireclay plastic refractories have gained wide use in industry for such applications as furnace linings, forming into refractory shapes, and quick repair jobs. An important requirement of this commodity, therefore, is that it flow without cracking while being rammed into molded shapes or furnace walls, and yet not deform under its own weight during subsequent drying.

Because of the numerous variables in determination of the workability of fireclay plastic refractories that affect their acceptability, the refractories laboratory of the National Bureau of Standards has conducted an extensive investigation of the reliability of the test method now accepted as standard. Results of tests on nine plastic refractories by R. A. Heindl and W. L. Pendergast have provided basic data for use in revision of the method and technics of testing such plastics that will furnish a truer indication of workability, as a basis for acceptance or rejection.

Sand Rammer Used

A measure of the facility with which plastic refractory material can be rammed into place as determined with a specified sand rammer has been designated "workability index" by the American Society for Testing Materials. The instrument used for determining the index, the "sand rammer," is so called because of its use in the testing of foundry sands. The first step in the ASTM test of plastic refractories involves the molding of a standard 300-gram cylindrical test specimen with 20 impacts (10 on each end) of a 14-lb. weight. Immediately the specimen has been removed from the mold, and its length measured, it is subjected to three additional impacts after which it is again measured. The plastic deformation computed from the difference in lengths and expressed in per cent, is the workability index. The specified permissible range of this index is from 15 to 35%.

The first of the variables investigated by the bureau was the mounting for the sand rammer. The results obtained with four types of mounting indicate that the rammer should be solidly mounted on a nonvibrating stone or concrete block in order that a minimum amount of the work performed would be absorbed by the support. Lubrication of the mold not only improved the appearance of the test specimens, but decreased the workability index as much as 20%. This was due to the decrease in friction between the wall and the plastic refractory—especially when the moisture content was low.

Cored Sample

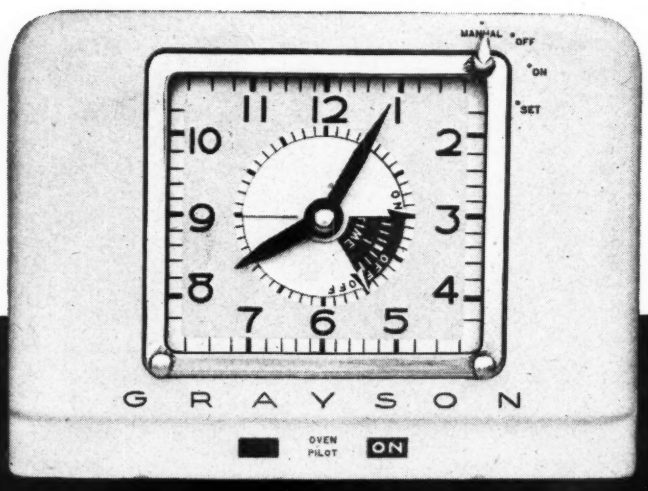
Obtaining of a cored sample with a steel tube, instead of a "grab sample," gave information on the extent of moisture variation in the plastic from top to bottom and across the 200-lb. container. For example, one plastic had an over-all moisture variation from 8.1% to 9.9%, with an average of 8.4%. The method of obtaining the sample as well as that of filling the mold resulted in pronounced differences in the magnitude of the workability index. The interior of the steel mold for forming the test cylinder should be machined smooth and a ¼-in. steel disk, made to fit the interior snugly, placed at each end of the test specimen during forming. The use of the disks prevents feather-edging of the specimen and possible loss of material.

The 20 impacts specified in the ASTM method of test for molding a plastic refractory do not always result in the specimen reaching maximum bulk density. Some of the plastic refractories investigated by the bureau reached their maximum bulk density (or minimum height) before 20 impacts, whereas others did not reach the same condition until 70 impacts. The further the specimen is from maximum density the greater the possibility that the workability index may be affected by disruptive failures rather than by plastic deformation. The index, therefore, may be misleading as it would indicate a workability higher than warranted. For instance, using the standard test method, an index of 24 was obtained for one of the specimens, signifying acceptable material. However, after 70 impacts the index was 13, indicating that the material should be rejected, which should have been the case initially as it was too stiff for satisfactory use.

As a result of the bureau investigations, it has been recommended that the workability of a plastic refractory be based on the amount of work required to reach maximum bulk density rather than on a deformation test. In addition, the findings also indicate the need for the standardization of the method of test.

Prize winner among floats in the Monon Centennial celebration held at New Albany, Ind., was this entry of the Indiana Gas & Water Co., Indianapolis. Pointing out that gas does the four big jobs "faster, cleaner, easier," the float was topped off by three models, two demonstrating Roper ranges while a third, not shown here, was ensconced in a bath tub —representing gas water heating.

A *cp* RANGE NEEDS



FOR automatic COOKING

GRAYSON CONTROLS

DIVISION ROBERTSHAW THERMOSTAT CO.
LYNWOOD, CALIFORNIA

For measuring specific heats of gases . . .

A NEW FLOW CALORIMETER

A new flow calorimeter for more accurate measurements of the specific heats of gases has been developed by R. B. Scott of the National Bureau of Standards. This apparatus was constructed in connection with a program sponsored jointly by the bureau and the Office of Rubber Reserve for the determination of the thermodynamic properties of materials involved in the production of synthetic rubber and related substances. The greater precision of the new instrument is chiefly due to the almost complete elimination of heat leaks by various features of design. The small heat capacity of the calorimeter also results in improved accuracy, says the bureau, through the easier and more rapid attainment of a constant temperature distribution within the system—since only under conditions of steady temperature is an accurate measurement possible.

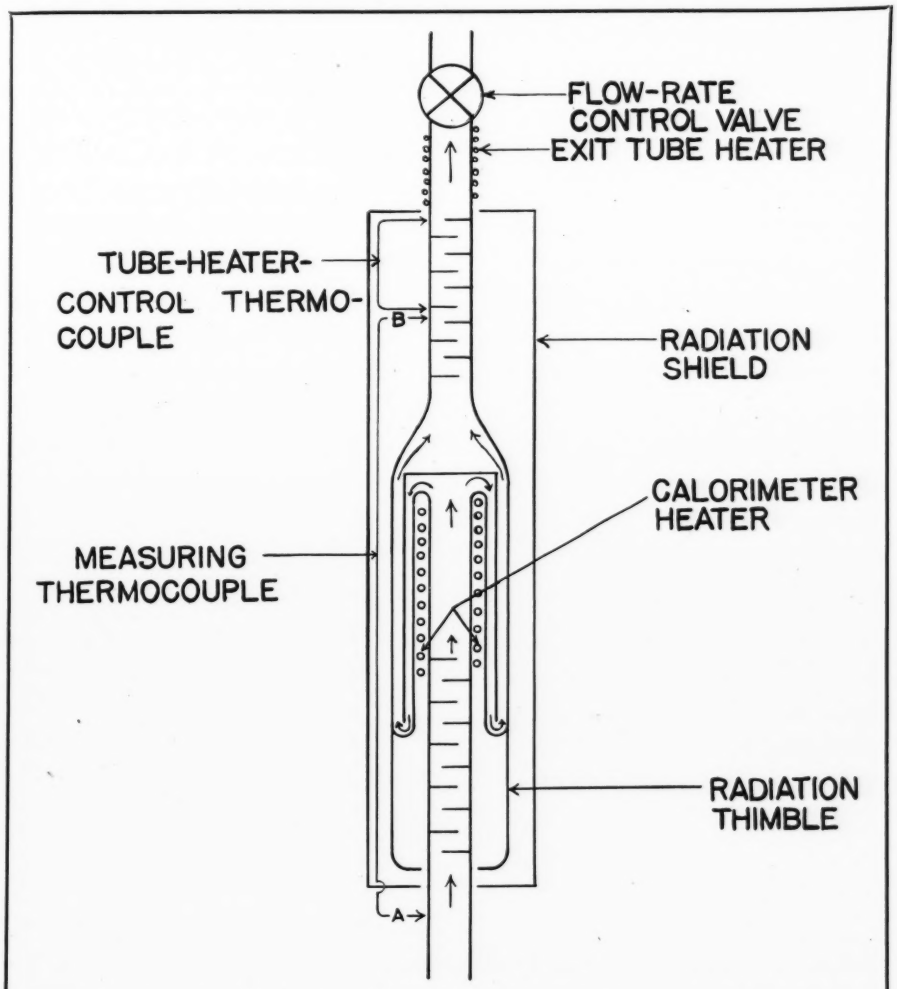


Fig. 1—Schematic diagram of the calorimeter developed for precision measurements of the specific heats of gases. Gas under study flows continuously at a constant rate through an insulated compartment, where it is heated electrically, and the specific heat is computed from heat input, temperature rise of the gas, and rate of flow. Entering the calorimeter at the bottom, the gas flows upward through the central calorimeter tube of monel metal past a series of baffles, that act as radiation shields and also promote thermal equilibrium between the gas and the tube walls. In the central part of the calorimeter the gas traverses a labyrinth about the calorimeter heater while its temperature is being raised. The labyrinth is designed to provide an isothermal exterior surface on this part of the calorimeter. The metal radiation thimble extends this isothermal surface to a point very near to where the tube enters the copper radiation shield. Heat exchange by radiation is prevented by heating the shield to the temperature of the inner calorimeter wall with an electric heater, adjusted manually according to thermocouple readings. The rise in temperature of the gas is indicated by the measuring thermocouple. After its temperature has been raised, the gas passes upward again past a series of baffles and out through the flow-rate control valve. The exit tube heater serves to establish a zero temperature gradient in the upper part of the tube, thus reducing heat transfer along the tube. The entire apparatus, except for the flow-rate control valve, is enclosed in a highly evacuated metal case (not shown) immersed in a constant-temperature bath. Before entering the calorimeter, the gas flows through a helical coil, in which it is brought to the temperature of the bath.

Accurate data on specific heats and other thermal properties of gases are of value to chemical industry, where they are used in calculations that predict the result of chemical reactions. With sufficient knowledge of the thermodynamic properties of the compounds involved, it is possible to state the range of temperature within which a given reaction will occur and to estimate closely the relative amounts of the products.

Reducing Heat Loss Ratio

Specific heat is most simply obtained experimentally by adding a measured amount of heat to a fixed mass and recording the temperature rise. However, the heat capacity per unit volume of a gas is so low that small accidental heat leaks are often comparable in size to the heat used in actually raising the temperature of the gas. Reduction of the ratio of heat loss or gain to heat input is thus one of the chief problems of gas calorimetry. In the calorimeter constructed at the National Bureau of Standards, this is accomplished by causing the gas to flow continuously at a uniform rate through an insulated chamber in which it is heated electrically. The heat capacity is then calculated from the heat input, the temperature rise of the gas, and the rate of flow. With gas calorimeters of this general type, a correction is usually made for heat leaks by making measurements at varying flow rates and extrapolating the apparent specific heats to infinite rate of flow, where such errors are negligible. In the new apparatus, however, special precautions have reduced heat leaks to such an extent that a correction for them is unnecessary. This advantage greatly lessens the number of necessary observations and also makes the results more trustworthy, since there are errors in calorimetric measurements that increase with increasing flow rate and cannot be removed by

extrapolation to infinite flow.

The entire calorimeter is immersed in a constant-temperature bath. The gas whose specific heat is to be measured enters the system through a copper helix, in which it is brought to the temperature of the bath. It then flows into the calorimeter proper, where it traverses a labyrinth surrounding a constantan heater, and leaves the calorimeter through a throttle valve. The temperature rise within the calorimeter is determined by appropriately located thermocouple junctions.

Obtaining Uniform Rate

A uniform rate of gas flow is obtained by maintaining a constant pressure on the inlet side of the calorimeter and a constant lower pressure at the outlet. Adjustment of the throttle valve in the outlet tube then provides the desired rate of flow, which is determined by weighing the gas colelcted in a condensing reservoir within a given time.

In the construction of the calorimeter, resistance to flow was reduced as much as possible, so that gases having low vapor pressures could be passed through the system at satisfactory rates. Since it was necessary to measure the specific heats of vapors that corrode copper and silver, all parts traversed by the gas were made of monel metal.

Heat leaks to or from the interior of the calorimeter are minimized in several ways. Conduction along the inlet and outlet tubes is reduced through the use of tubing of monel, a poor-conducting metal, having a wall thickness of 0.01 in. Radiation along the tubes is prevented by a series of baffles, which in addition promote thermal equilibrium between the gas and the tube walls. Heat leaks due to either conduction or radiation are also lessened by providing a long section of tubing between the inlet and the heater, and by heating the outlet to the final temperature of the gas. Radiation to or from the inner portion of the calorimeter is prevented by a copper radiation shield kept at the temperature of the inner adjacent calorimeter wall by means of an electric heater. The necessary adjustments in the power to the heater are made in accordance with the readings of a three-junction thermocouple.

The accuracy of the apparatus was checked by measuring the specific heat of oxygen[1] which had previously been accurately calculated at the bureau from the latest spectroscopic data for this gas. The experimental valves obtained at —30°, 40° and 90°C differed from the spectroscopic valves by 0.06, 0.00, and 0.10% respectively. From a consideration of the data for oxygen, the probable error of the specific heats obtained with this calorimeter is estimated at 0.07%.

The new calorimeter has been used at the bureau by Ruth K. Cheney, Jane W. Mellors, R. B. Scott, and P. F. Wacker to determine the specific heats from —30° to 90°C of isobutane, isobutylene, 1-butene, *cis*-2-butene, butadiene, styrene, and ethylbenzene[1 2]. Isobutane is a principal raw material for the production of aviation gasoline and is also converted to isobutene—a substance used in large quantities for the preparation of butyl rubber and isobutanol. 1-Butene, like the 2-butenes, is converted to butadiene, the major component of GR-S rubber. A knowledge of the thermodynamic properties of these materials is expected to aid in the more efficient operation of plants in which they are produced or used.

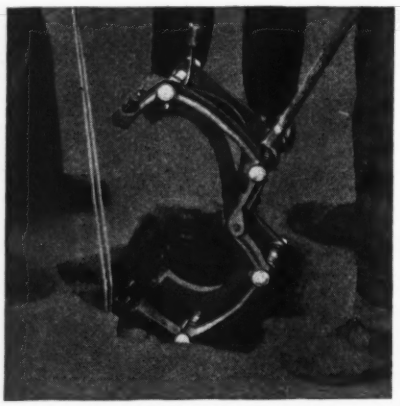
[1] Paul W. Wacker, Ruth K. Cheney, and Russel B. Scott, "Heat Capacities of Gaseous Oxygen, Isobutane, and 1-Butane from —30°C to +90°C," J. Research NBS 38, 651 (1947) RP 1804.

[2] Russel B. Scott and Jane W. Mellors, "Specific Heats of Gaseous 1,3-Butadiene, Isobutene, Styrene, and Ethylbenzene," J. Research NBS 34, 243 (1945) RP 1640.

NORMAC

BELL JOINT CLAMP

6 inch NORMAC clamp being lowered into hole for installation

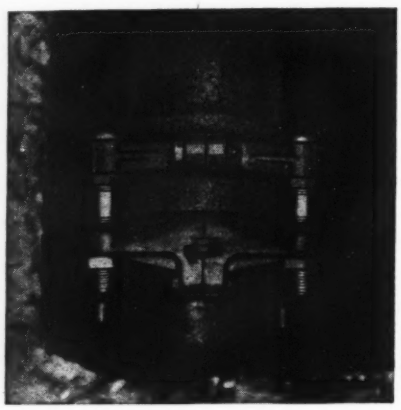


Solves Your Joint Repair Problems

- QUICK
- EASY
- PERMANENT

Installed in pavement openings 1′ x 1′. Available in all standard sizes from 3″ to 12″. A simple set of tools cleans the joint, installs the clamp . . . often in only a quarter of an hour. SAVES TIME. SAVES MONEY and the repair is permanent. Designed for all conditions particularly where pavement repair costs are prohibitive. Write for literature illustrating this simple solution to one of the Gas Industries most trying problems and ask for our catalog describing our complete line of

6 inch NORMAC clamp in service after installation



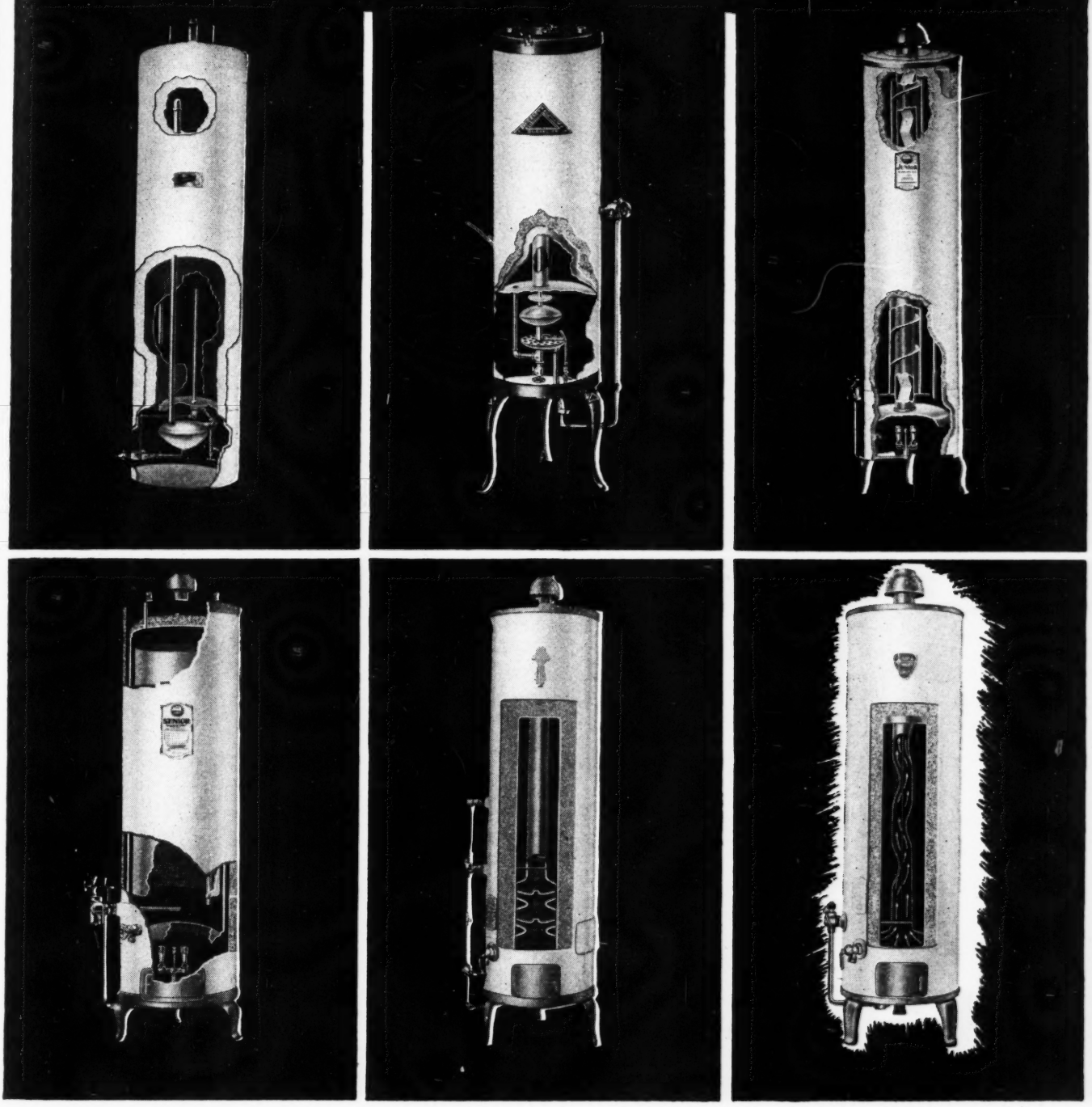
COUPLINGS . . . FITTINGS SERVICE TEES and ELLS SLEEVES . . . COMPRESSION-END COCKS . . . COMPRESSION-END METER BARS

NORTON-McMURRAY MFG. CO.

39 SOUTH LA SALLE ST. • CHICAGO 3, ILL.

Method and product covered by U.S. Patents, Nos. 2,163,261 and 2,178,286.

WE'VE MADE THEM ALL!



DURING over 30 years of experience in manufacturing automatic, storage gas water heaters, Day & Night has made and sold heaters of all the standard types of construction.

We believe we are making today, in our Heat Trap flue heater, the best water heater in our history, but in our Engineering and Research Laboratory, the search for improvements in design, performance and methods of manufacture never ceases. Our entire engineering staff and research laboratory are dedicated to the task of keeping Day & Night the best engineered water heater on the market.

DAY & NIGHT

DAY & NIGHT MANUFACTURING CO.
MONROVIA, CALIFORNIA
One of the Dresser Industries

MIRROR

PATENTED STOVE PIPE CO.

Hartford, Conn.

Manufacturers of:

★ **Mirror Patented Black Enamel**

★ **Chromesteel**

★ **Galvanized**

★ **Blue**

● **Diverters Box, Offset, and Pyramid**

● **Down Draft Hoods**
● **Pipe**
● **Elbows**
● **Collars**
● **Fittings**

Products Are Made According to A.G.A. Specifications.

Catalogue on Request.

The one gas odorant with all the Advantages

Captan

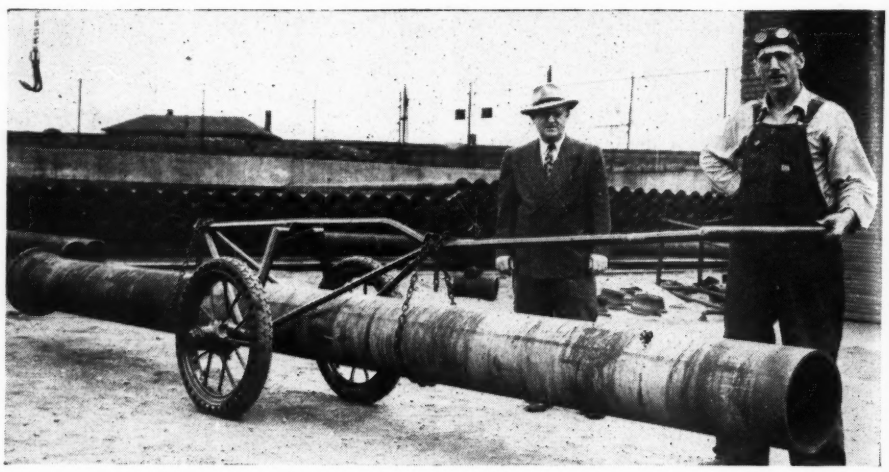
- *gas like smell*
- *high odorizing value*
- *non fading*
- *uniformity*
- *availability*
- *expert help in use of* **captan**

NATURAL GAS ODORIZING CO. INC

7620 wallisville road

HOUSTON 10, TEXAS

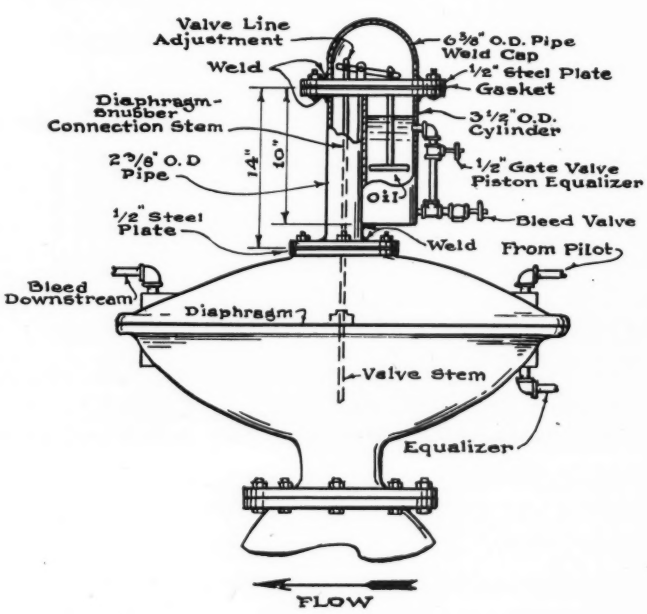
Two-Wheeled Lifting Cart Makes Pipe Handling A One-Man Operation



SUGGESTED BY Fred Kerstein, South district, Peoples Gas Light and Coke Co., Chicago. Photograph supplied by "Gas News."

With this two-wheeled, rubber-tired cart two men—and most of the time one man—can pick up a substantial load with ease and safety. By raising the forward end of the cart, the handle is moved upward. This lowers the rear end down to the object. The lifting chain can then be wound around the object twice, the front end is pulled down, and the chain is fastened. The cart is placed over the pipe so the load is balanced, and the same method is used to unload.

Device for Damping Liquid Pulsation On High Pressure Regulators



INVENTED BY Russell V. Staves, measurement engineer, Panhandle Eastern Pipe Line Co. This idea is being used on high pressure first cut regulators at Panhandle's Greensburg, Olpa and Houstonia fuel stations.

As constructed for present use the snubber consists of a 14-in. piece of 2-in. line pipe with a ½-in. steel plate welded on one end, drilled, and adapted to fit top of diaphragm case of 3-in. Emco HPBV pilot-loaded regulator. A 10-in. piece of 3½-in. OD pipe is welded to 2-in. line pipe horizontally and even with top end of 2-in. piece. The bottom of the 3½-in. OD pipe is flat-capped, forming reservoir for 140 or 150 weight oil. A ½-in. plate approximately 10 in. in

diameter is cut to fit the openings of the two pipes which represent an unbalanced figure eight in appearance.

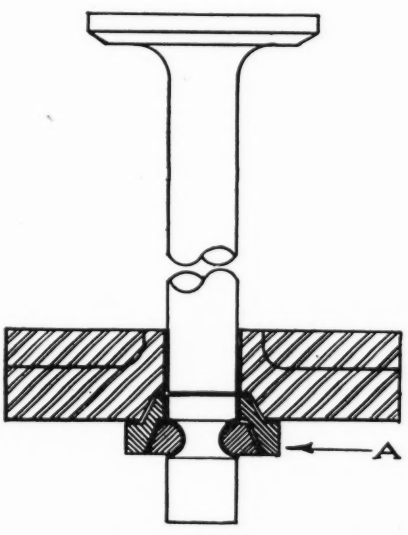
This plate is welded solidly to the two pipes and an eight bolt circle is drilled and tapped for 7/16 in. x 1¼ in. cap screws forming gasket base and inspection table. A 6⅝-in. OD pipe cap welded to ½-in. plate cut and drilled to fit base plate completes housing for oil reservoir, diaphragm connecting stem, two-to-one leverage link and piston. A bypass consisting of ½-in. fittings is constructed around piston allowing manual speeding or slowing piston travel.

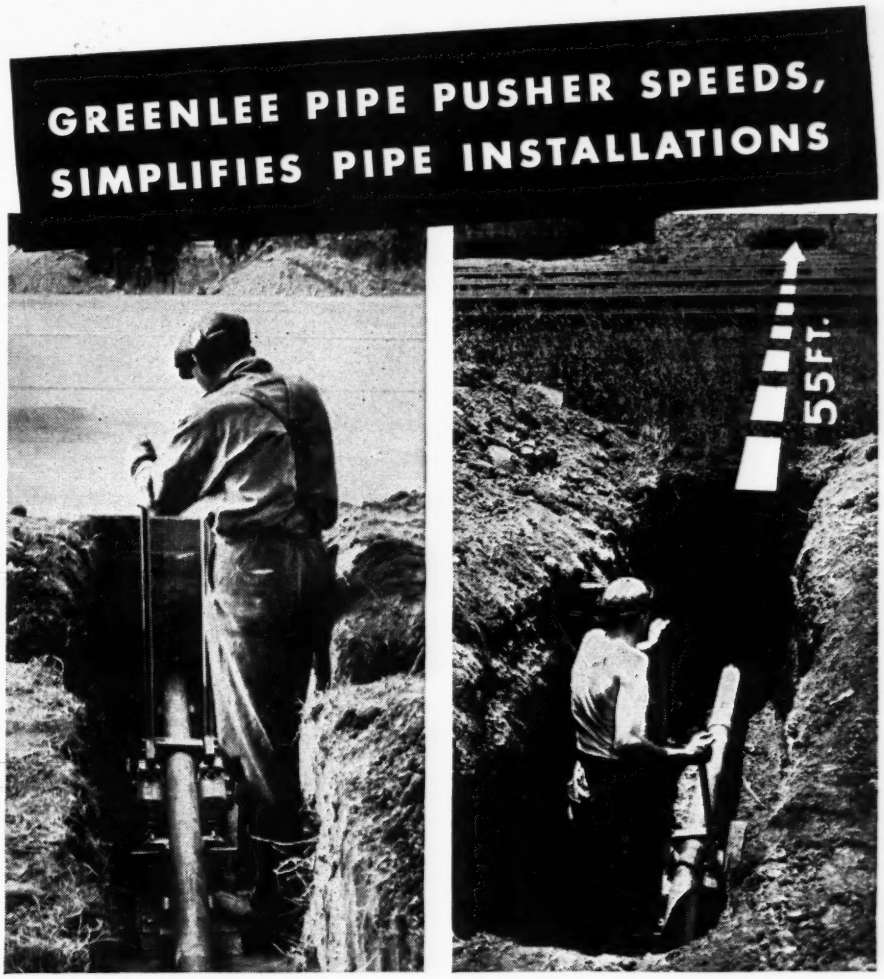
The snubber slows or stabilizes the valve and diaphragm travel only to the extent that pilot is enabled to compensate for the numerous irregularities encountered in the regulation of high velocity gas, thus eliminating pumping of regulator.

Exhaust Valve Life Extended by Bushing

SUGGESTED BY T. C. Shepherd, chief engineer, Houstonia station, Panhandle Eastern Pipe Line Co. Illustration through the courtesy of "Panhandle Lines."

By inserting bushing as shown at "A" in the drawing, ¾ in. is gained, thus pushing the valve guide up in normal position. This keeps the guide from resting on rocker arm. The tension lost on the valve spring is eliminated because of refacing valves and seats. One to three years' wear has been made possible on valves and seats which would have been discarded in the past. These bushings can be used on 1300-hp Cooper-Bessemer engines and, by making some changes, they can be used on 1000-hp engines.





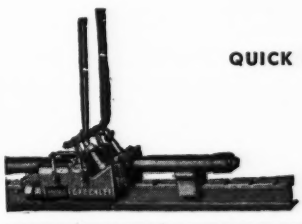
UNDER STREETS...UNDER RAILWAYS,
sidewalks, lawns and other obstacles

With a GREENLEE Hydraulic Pipe Pusher one man can *push pipe* through the ground, *easily, quickly* — under streets, railways, walks, lawns, flooring and other obstacles.

Think of the time, labor and inconvenience this saves! Eliminates extensive ditching as just a short trench accommodates the pusher . . . no tearing up of pavement, lawns, floors . . . eliminates back-filling, tamping, tunneling, repaving. Cuts job time to a fraction!

Get facts and figures on the timesaving GREENLEE Hydraulic Pipe Pusher which, as many owners report, "pays for itself on the first few jobs." Write Greenlee Tool Co., Division of Greenlee Bros. & Co., 1970 Columbia Avenue, Rockford, Illinois.

TOOLS FOR CRAFTSMEN
GREENLEE



QUICK FACTS ABOUT THE GREENLEE HYDRAULIC PIPE PUSHER

Easy — one or two men can easily operate on any job. *Portable* — compact, easy to carry to job and set up. *Fast* — operates at six different speeds. *Two models* — (1) for pipe up to 4-inch; (2) for larger pipe, drainage ducts, concrete sewer pipe. Do the job easier, quicker with a GREENLEE.

PEOPLE

E. B. ORCHARD, 36, has been promoted to sales manager of the Houston division of the United Gas Corp. He was formerly new business supervisor. Orchard will supervise the division's domestic, commercial and industrial sales and will supervise a staff of approximately 30 persons.

JAMES P. HANLAN recently retired from his duties as sales manager for the Public Service Electric and Gas Co., Newark, N. J., after more than 53 years with the firm. Hanlan began his career with the utility as a lamplighter while still in school. Later he became a full-time employee of Hudson County Gas Co., a predecessor company. Hanlan has held the following important positions in the gas industry: president and director, New Jersey Gas Association; chairman, AGA Residential Section; vice president, Eastern States Gas Conference; and chairman, New York-New Jersey Regional Sales Conference.

T. FRED HUDGINS has resigned as export manager of Clark Bros. Co. He plans to found his own business in Dallas, Texas. R. R. McCARTNEY, while retaining his post as district manager, will become export manager.

AVERY G. VAN CAMPEN, who has headed the technical service department in the New York office, will be the sales engineer. ROBERT SPEARS, for a number of years in the technical service department at the home office at Olean, N. Y., and who was recently transferred to the technical service department of the New York office, will take over Van Campen's post as head of that department.

J. W. SIMPSON, vice president in charge of sales, Mueller Co., Decatur, Ill., has announced the appointment of HUGH L. BAKER as general sales manager. Baker formerly was assistant general sales manager. Simpson will continue in an advisory capacity and will work with the company's engineering department on new products. ROBERT K. LEVEY, who has been assistant sales manager with Baker and was formerly a salesman in the Chicago territory, will handle promotional and sales personnel work and eventually will spend much time in the sales territories.

H. L. Baker

J. W. Simpson

DONALD C. SCHEELE has been promoted to general and sales manager and ROBERT B. McCORMICK to treasurer of Burdett Manufacturing Co., Chicago. Scheele has been an engineer with Burdett for nine years, and McCormick also rose through the ranks of the organization. The firm is pushing a new sales program on its infra-red gas burners.

LYNN EATON has been appointed by Bendix Home Appliances, Inc., to direct the company's field sales representatives and oversee distributors' sales operations. Since 1945 Eaton had been eastern regional sales manager.

Paul C. Joy

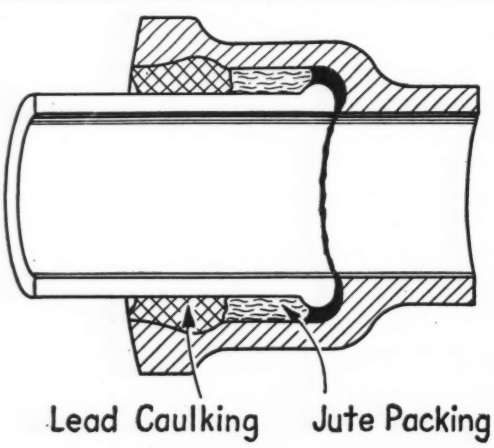
PAUL C. JOY, formerly a chemist and engineer with Southern California Gas Co., has joined the staff of the Honolulu Gas Co. and will serve as process development engineer under Harold P. Saueressig, plant superintendent. The appointment was announced by John J. Winn, Jr., vice president and general manager of the Honolulu firm. Joy will devote his efforts to the company's long range program of improvement of gas and its manufacturing processes. Immediately prior to joining Honolulu Gas, Joy was for a short time with the Northern American Aviation Co. as a development engineer in fuel studies for guided missiles.

CHANGING OVER?

. . . then consider "Carboseal" Anti-Leak

Are you changing over to distribution of dry manufactured and natural gas or propane or butane? If so, you should anticipate the maintenance problems of a dry-gas distribution system. The jute packing of bell-and-spigot joints dries out rapidly in a dry-gas system. The result is increased leakage of gas, vegetation damage, and possible hazardous conditions.

"Carboseal" anti-leak will help you solve such maintenance problems. This compound is easily introduced into gas mains—it swells the jute fibers and keeps joints gas-tight indefinitely. The average cost of "Carboseal" to treat one mile of three-inch equivalent main is $85.00. "Carboseal" anti-leak users have frequently experienced as much as 100 per cent leakage reduction! Joints treated thirteen years ago are still gas-tight as indicated by the soap test.



How "Carboseal" Anti-Leak Works

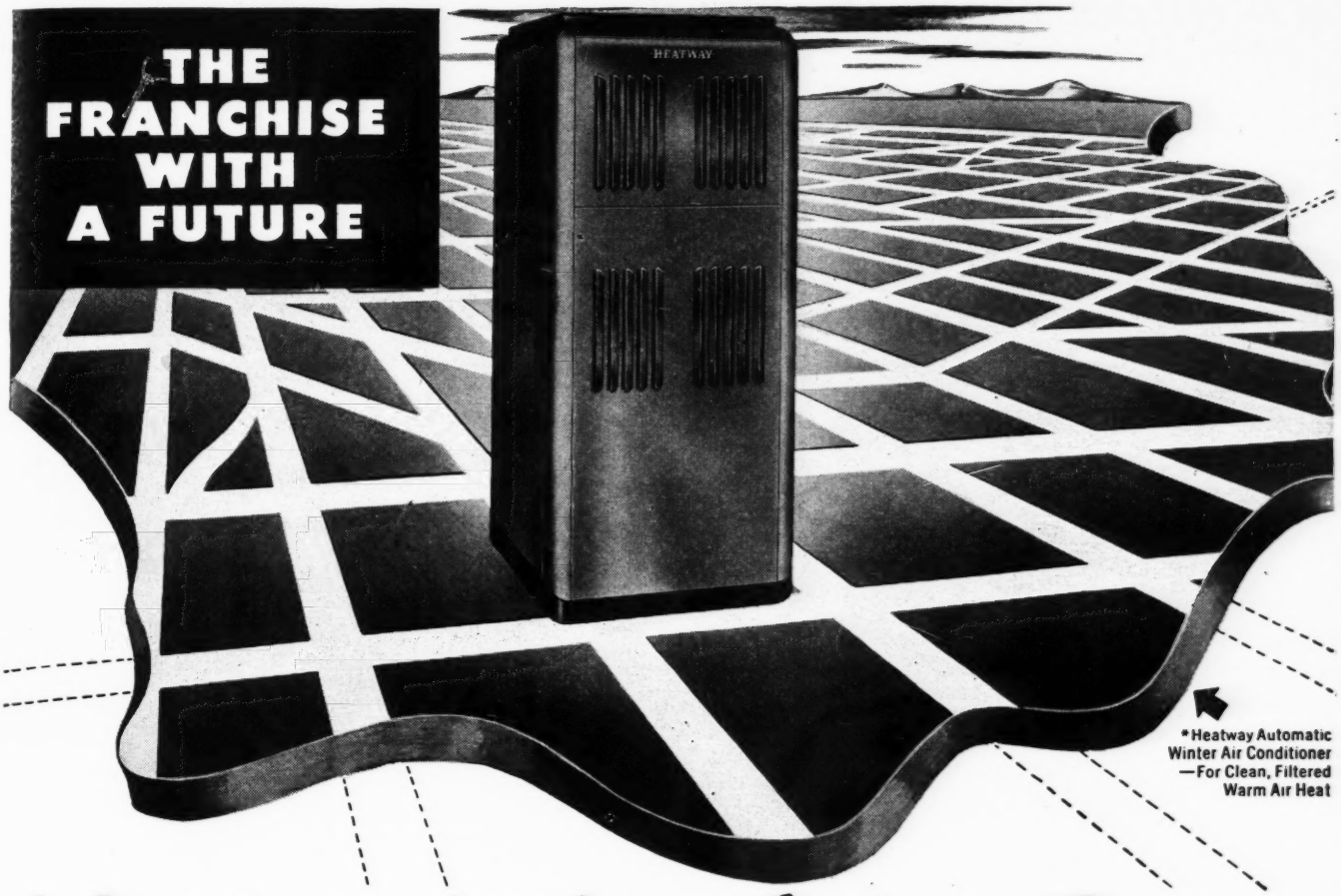
A typical bell-and-spigot joint is illustrated where jute fiber packing is depended upon to prevent gas leakage. "Carboseal" Anti-leak, when introduced into gas mains by any of the various methods accumulates at the bottom of the main and reaches every joint. Dried-out jute fiber packing takes up "Carboseal" by capillary action — like a sponge soaks up water. "Carboseal" swells jute fiber packing as much as 44 per cent and makes joints gas tight indefinitely.

Complete information on application, cost, and results to be obtained with "Carboseal" anti-leak treatment is available in a 20-page booklet. Write for your copy today.

Carbide and Carbon Chemicals Corporation
Unit of Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York 17, N. Y.

CARBOSEAL ANTI-LEAK

"Carboseal" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.



A Distributorship for an Exclusive Territory to Sell Heatway Appliances

THE HEATWAY FRANCHISE offers you a line of products that you can sell not only *today*—but in the future when the competition really gets tough!

Heatway is a national organization with millions invested in factories and research facilities. From these plants comes a full line of heating appliances—gravity furnaces, automatic winter air conditioners, console heaters, floor furnaces, blowers—in all sizes, for all fuels!

All of these appliances are "tops" in design and engineering. And research is constantly developing new improvements. So when you get a Heatway franchise, you're backed up by an organization that is producing for today and planning for tomorrow.

You have the advantage of buying all of your appliances through one source—which means that you can get assorted merchandise in quantity and take the profitable discount for carload lots.

You have the backing of national advertising which sifts out interested appliance customers by name. These prospective buyers are referred to their local dealer. There's an extra 2% advertising allowance on all earned invoices.

And your dealers enjoy the Heatway Floor-Finance Plan, which permits them to carry a full line of appliances for only a 10% cash down payment.

Distributorships are still open. Act now if you want profits for today—and tomorrow! Just send in this coupon.

***HEATWAY AUTOMATIC WINTER AIR CONDITIONER. Up-to-the-minute in design and engineering, it's fully automatic. Heatway plants are now producing it in quantity. The Automatic Winter Air Conditioner and all the other Heatway appliances are available for immediate delivery.**

HEATWAY, Dept. H-D-11
20 West 43rd Street, New York 18, N. Y.

I'm interested in the Heatway Franchise.

NAME_____

FIRM_____

ADDRESS_____

CITY_____ **STATE**_____

HEATWAY

Modern Heating for Modern Living

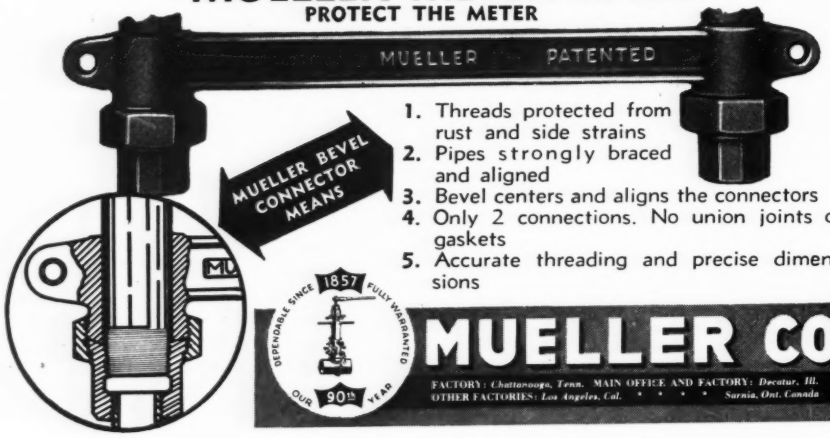
CROSS-SECTIONAL VIEW OF "UNIT LOADING" METHOD

Thousands of Miles

of FACTORY processed *coated-and-wrapped* pipe, delivered to all points of the compass—in as perfect condition as this unretouched photographic reproduction. WHY?—Because it is HILL, HUBBELL *precision applied coating—and—wrapping plus,* EXACTING—TIME PROVED—"UNIT LOADING" method of gondola loading.

Hill, Hubbell and Company
Division of GENERAL PAINT CORPORATION
3091 MAYFIELD RD. CLEVELAND, OHIO.

MUELLER METER BARS
PROTECT THE METER



1. Threads protected from rust and side strains
2. Pipes strongly braced and aligned
3. Bevel centers and aligns the connectors
4. Only 2 connections. No union joints or gaskets
5. Accurate threading and precise dimensions

DEPENDABLE SINCE 1857 FULLY WARRANTED OUR 90th YEAR

MUELLER CO.
FACTORY: *Chattanooga, Tenn.* MAIN OFFICE AND FACTORY: *Decatur, Ill.*
OTHER FACTORIES: *Los Angeles, Cal.* * * * *Sarnia, Ont. Canada*

WILLIAM F. WEIMER, for the past several years assistant advertising manager of Rockwell Manufacturing Co., Pittsburgh, has been named advertising manager of the company's Pittsburgh Equitable Meter Division. Weimer will have charge of the complete advertising program for Pittsburgh Equitable's lines of water, gasoline, oil and gas meters, gas regulators, and other products and will continue to asist in the administration of the over-all advertising program.

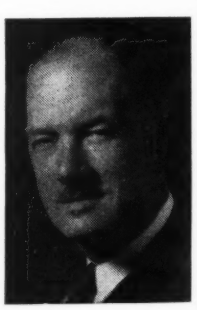
E. F. Dobson

EDWARD F. DOBSON took office Oct. 1 as president and director of Florence Stove Co., Gardner, Mass. ROBERT L. FOWLER, former president and chairman of the board, continues as board chairman. Dobson was president of Rundle Manufacturing Co., Milwaukee, Wis., and has spent his entire career in the field of manufacturing. He has been closely associated with all phases of factory production and operations.

JOHN J. METZ, who has devoted 60 years to the service of American Stove Co., has retired. Metz's first job with the firm in 1887 was as a burner assembler in the Quick Meal Division of a predecessor company. He was placed in charge of the service and repair department, and finally, of the sample floor. Metz holds the record for the longest period of continuous service with the company.

HELEN F. VERNON has been appinted home service director of Binghamton Gas Works, Binghamton, N. Y., succeeding Helen Wilcox. She formerly was associated with the Bellevue, Pa., district of the Manufacturers Light & Heat Co. as home service director.

- OBITUARIES -



J. H. Emery

JOHN H. EMERY, vice president of Roberts & Mander Corp., Hatboro, Pa., died Aug. 24 after an illness of several weeks. He was 49 years old. Emery joined the company in 1945 as district manager of the New York office. Last February he assumed the position of vice president. He graduated from the University of Michigan in 1919 and became eastern sales manager for Sullivan Machinery Co. of Buffalo.

GEORGE A. RANNEY, 73, chairman of the board of Peoples Gas Light and Coke Co., Chicago, recently died in his sleep at a Hot Springs, Va., resort hotel. For many years he was associated with the International Harvester Co. He entered the utility field in 1933 and became chairman of the board of Peoples Gas Light two years later.

P. E. Fluor

PETER E. FLUOR, 52, president and chairman of the board of directors of The Fluor Corp., Ltd., Los Angeles, passed away suddenly on Sept. 10 at his home in Anaheim, Calif. With the company since 1915 and president since 1934, he was largely responsible for the development of the corporation from a small general contracting concern in Santa Ana to its present status. Born in Oshkosh, Wis., in 1895, Fluor moved to California in 1912 and, with his father, was among the first to enter oil field construction work in the state. Industrial associations to which he belonged included the California Natural Gasoline Association, the Western Oil and Gas Association, and the American Petroleum Institute.

JAMES A. RICHIE, 69, vice president, secretary-treasurer and director of the Republic Light, Heat & Power Co., Inc., Buffalo, N. Y., died Aug. 19 in Buffalo. He became secretary-treasurer of Republic and of a subsidiary, Dominion Natural Gas Co., Ltd., in 1914 and had held the two positions ever since. He was associated with the public utility division of Cities Service Co. since 1906 and at one time worked with public utilities in Denver and Spokane. Richie was a director and treasurer of the Natural Gas & Petroleum Association of Canada.

GUSTAVUS J. THOMPSON, for many years district manager of the Ruud Manufacturing Co. in the state of Texas, died at his home in Dallas on Aug. 3. He joined the Humphrey Division of Ruud in 1913 and was attached to the sales department with headquarters in Kalamazoo, Mich. In 1931 he was transferred to Texas. Thompson retired from active service in 1942 because of ill health.

THEODORE D. CROCKER, president of the Northern States Power Co., Minneapolis, Minn., died recently at the age of 68. In 1912 he went to Minneapolis and became assistant to the vice president general manager. Crocker was made assistant general manager in 1923, vice president and director in 1931, vice president and general manager in 1942, and president and director in 1943.

SALES SLANTS

Range Shipments Up 40%

Despite continuing steel shortages, the Gas Appliance Manufacturers Association reports that gas ranges produced and shipped during the first six months of 1947 totaled 1,166,000 units, an increase of 40.6% over the 829,300 units shipped during the corresponding period in 1946.

The industry's 1947 gas range production is 10,600 units under its peak year of 1941, when 1,176,600 gas ranges were shipped during the first six months.

Estimated manufacturers' value of gas ranges shipped during the first half of 1947 is approximately $94 million and, according to GAMA's estimate, 25.5% of the gas ranges shipped during this

THE SMALL EXTINGUISHER..
WITH THE MIGHTY PUNCH!

FOR FIRE HAZARDS THAT DO NOT DEMAND LARGER EQUIPMENT . . .

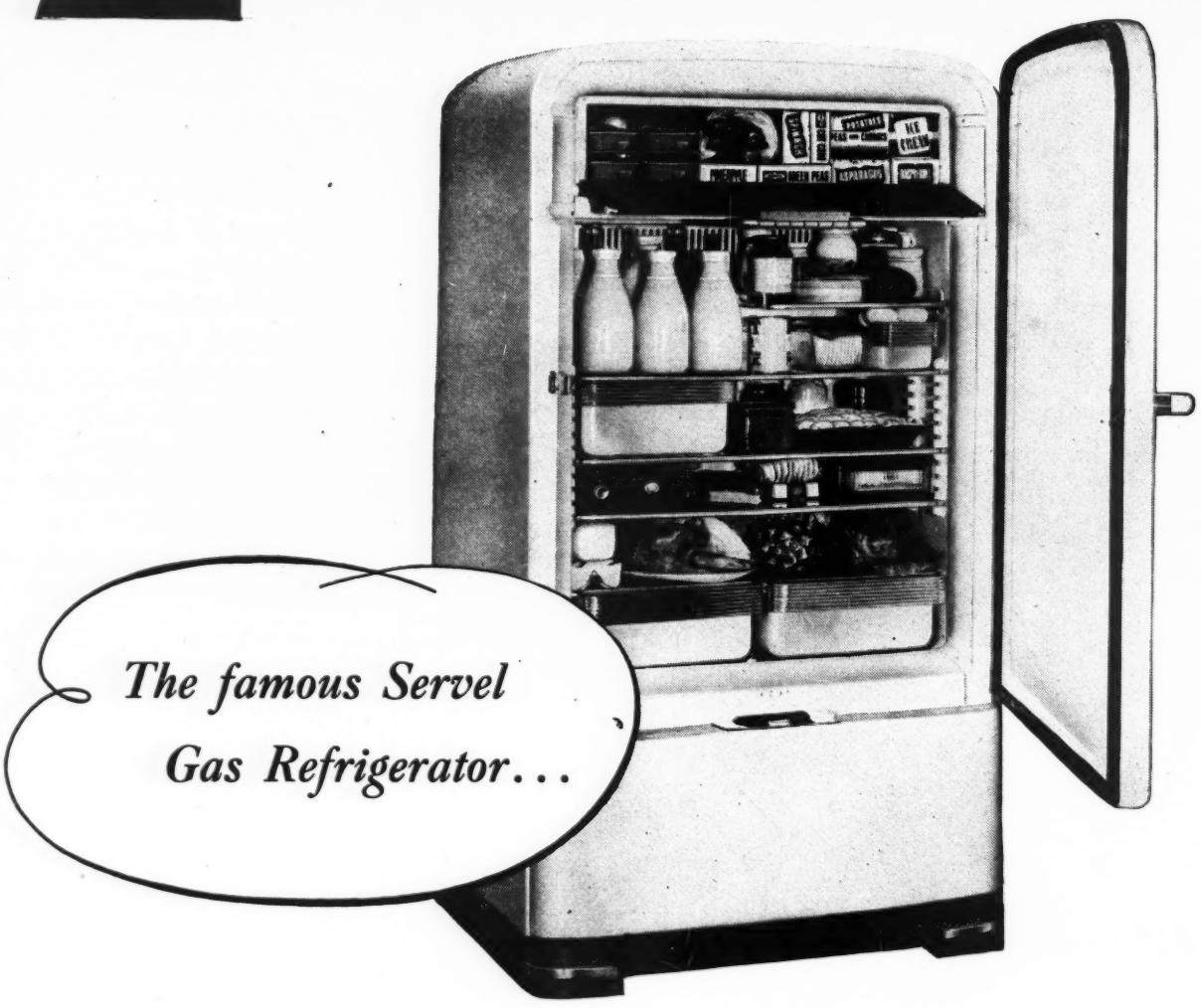
The new ANSUL 4 Dry Chemical Fire Extinguisher has fire stopping effectiveness far in excess of any other extinguisher of comparable size. Its compact size makes it ideal for locations where space is limited. The ANSUL 4 is easy to use . . . easy to recharge on-the-spot . . . and again ready to

STOP FIRE FASTER!

MADE BY THE MAKERS OF ANSUL-DUGAS DRY CHEMICAL FIRE EXTINGUISHERS, MODELS 20, 30, 150A AND 350A.

ANSUL CHEMICAL COMPANY
FIRE EXTINGUISHER DIVISION, MARINETTE, WISCONSIN

SERVEL'S GREAT FAMILY BUILDS GAS LOAD AND



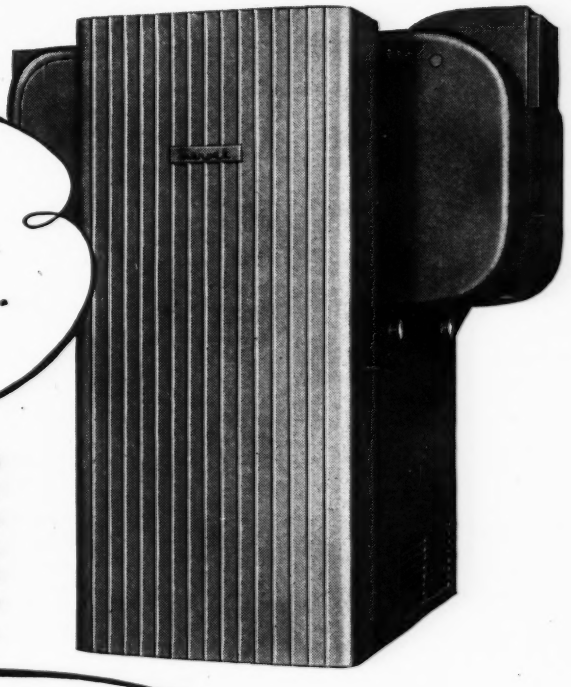
The famous Servel Gas Refrigerator...

Here's the *only* refrigerator made today that gives your customers all the up-to-date cabinet features of modern food storage PLUS silent operation with no moving parts. What's more, the Servel Gas Refrigerator paves the way for the all-gas kitchen by protecting and insuring your domestic gas cooking load . . . and dramatizing the modernity of gas and gas appliances.

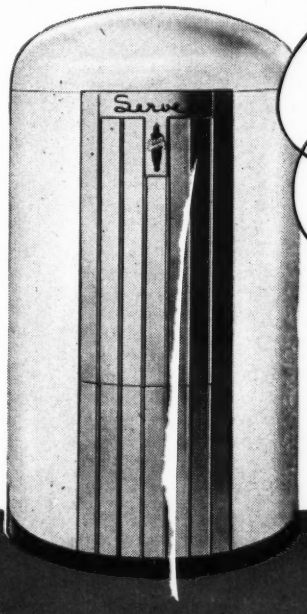
Servel Inc.

OF QUALITY APPLIANCES GOOD WILL FOR YOU!

The tried and proved Servel
All-Year Gas Air Conditioner...



Here's your great opportunity to build all-year gas load and promote the all-gas home . . . with the Servel *All-Year* Gas Air Conditioner. Already Servel has been tried . . . proved . . . and found successful in homes, stores, and office buildings all over the country. Not only does All-Year Gas Air Conditioning protect your base gas load, but greatly supplements it . . . *all year long.*



The new Servel Ball-Type
Gas Water Heater...

Now that automatic washing appliances have such terrific appetites for hot water, here's the answer to your customers' demand for modern hot water service—the Servel *Ball-Type* Gas Water Heater. Independent laboratory tests have proved that Servel can handle the most rigorous loading of *any* automatic home laundry machine.

EVANSVILLE 20, INDIANA

period were for use with liquefied petroleum gas.

Automatic gas water heater shipments for the first six months of 1947 reached an all-time high of 937,700 units, representing an increase of 74.8% over this same period of 1946.

Manufacturers' value of automatic water heaters shipped during this first half of 1947 is estimated at $42.8 million.

Indications are that 24.4% of the total shipments of automatic gas water heaters during the first six months' period of this year were for use with liquefied petroleum gas.

HOWARD SUPPLY CO. observed the tenth anniversary of its founding in September. The firm, with its original five employees, moved into the vacated five-acre plant of the old Union Iron Works at 5125 Santa Fe Ave., Los Angeles, in 1937.

Ten years later, Howard Supply has grown to include 10 field stores in California oil producing areas, a warehouse at Oakland to serve territory north of San Francisco, as well as the original Los Angeles plant. The staff of five employees now numbers well over 200. Where the firm first represented two lines of equipment, that number also has passed the 200 mark.

Under the leadership of Harold E. Howard and four other incorporators, L. George Trembley, Arthur G. Moyer, Earl Covel and Don Lucas, Howard Supply promotes specialized service which is now maintained by more than 40 field men who cover the California territory.

American Meter Co. has announced the opening of its new factory and office building at 950 Tennessee St., San Francisco 7, Calif. The new headquarters will coordinate and round out total gas meter production for the requirements of the Pacific Coast. The factory is completely equipped with modern machinery and facilities for the manufacture, repair and testing of gas meters and is outstanding from the standpoint of appearance, light and ventilation. The official opening was celebrated with an open house for employees, their families and friends, and gas men of northern California.

BENDIX HOME APPLIANCES, INC., South Bend, Ind., celebrated reaching a milestone—a million automatic washers produced and sold in seven years—as executives and 450 members of 78 distributorships adjourned a four-day convention, Aug. 21-24.

A nationwide sales contest, offering $1 million in prizes to dealers, retail salesmen and distributors' sales executives, will be utilized to spring the company on its "second million."

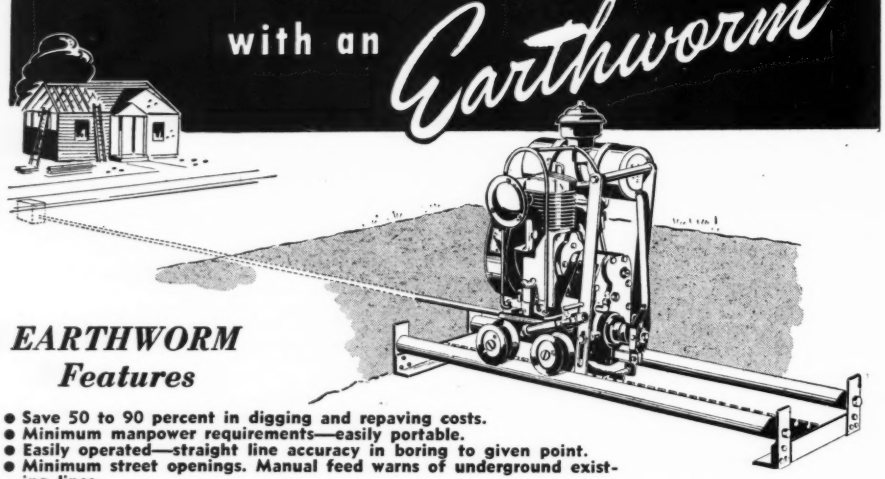
BRITISH COLUMBIA ELECTRIC RAILWAY CO., Vancouver, has announced some changes in its postwar dealer plan. Two years ago when the company started to make its withdrawal from the major appliance field, an advertising allowance and unit bonus on appliances sold was offered to dealers. Since then the company has made available a sales training course not only to help in the sale of electrical and gas appliances, but also to aid in the development of better business management systems.

A dispiay consultant has also been made available to dealers, and an appliance repair consultant is maintained on the B. C. Electric staff to advise dealers on their service problems.

The company has now entered a phase of its dealer cooperative sales plan, where it feels that the $3 unit bonus paid can be more effectively used to aid the dealers in other ways. On sales made to residential accounts in the future, the B. C. Electric will pay the dealer an advertising allowance of .5% of reported sales volume on electric and gas appliances listed on the retail dealers' appliance sales report.

Appliance dealers in Vancouver are also being urged by B. C. Electric to check their list of customers wishing to buy refrigerators, ranges and washers. It is pointed out by the dealer promotion division of the company that once a dealer has accepted a customer's name during a period when appliances were in short supply, the name cannot be ignored. Dealers are advised, on the other hand, to see that their lists are carefully brought up to date. It is suggested that each of these prospective customers should be sent a self-addressed card, stating their requirements for all appliances.

INSTALL UNDERGROUND LINES
FASTER—CHEAPER—
with an Earthworm



EARTHWORM Features

- Save 50 to 90 percent in digging and repaving costs.
- Minimum manpower requirements—easily portable.
- Easily operated—straight line accuracy in boring to given point.
- Minimum street openings. Manual feed warns of underground existing lines.
- Quickly pays for itself—average boring speed, 1½ ft. per min.
- Complete unit—requires no auxiliary equipment.

Over 60 percent of our post-war production has been purchased by pre-war users.

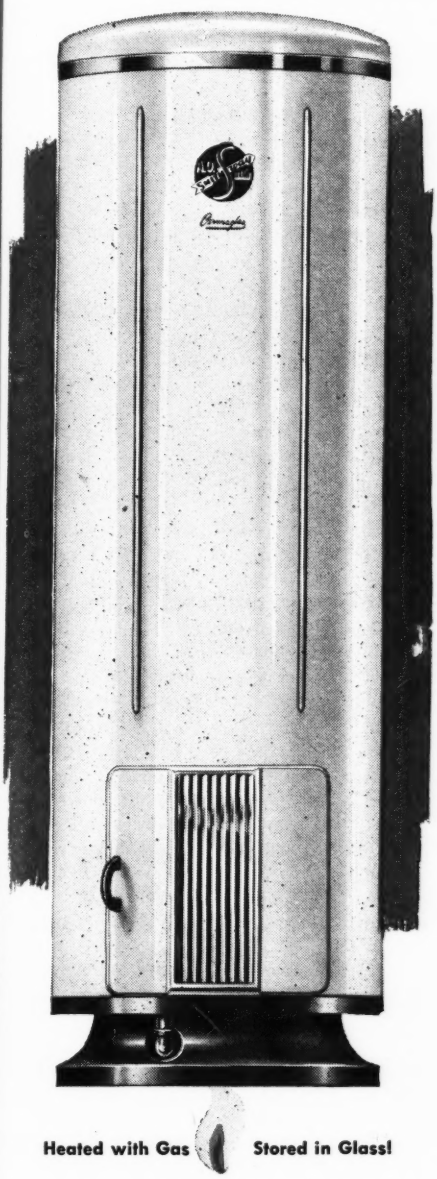
3 Models — Write for delivery and operating instructions.

Mailing Address: BOX 1100

Earthworm

BORING MACHINE • MANUFACTURED BY LUBE JACK CO., SANTA MONICA, CALIF.

More of your customers make this NEW DISCOVERY about Hot Water EVERY DAY!



Heated with Gas — Stored in Glass!

Permaglas

TRADE MARK REG. U. S. PAT. OFF.

SMITHway WATER HEATERS*

CANNOT RUST OR CORRODE

No wonder *Permaglas* Water Heaters are so popular! Home owners everywhere have discovered that it is actually cheaper to install this automatic water heater—and avoid costly, frequent replacements later.

In your community thousands of home owners and home builders are reading and hearing the "*Permaglas*" news every day. In leading popular magazines the largest advertising program in water-heater history is *pre-selling* this new kind of hot-water convenience.

People know the *Permaglas* Water Heater has the long-life tank of glass-fused-to-steel. They know that under *any* water condition it CANNOT rust or corrode . . . it ends tank rust and corrosion stain . . . it CAN'T rust out!

Get all the facts on this No. 1 profit opportunity—today. Just send the coupon below.

There's Only ONE "PERMAGLAS" —A Great Aid to Sales

A. O. SMITH Corporation

New York 17 • Atlanta 3 • Chicago 4 • Houston 2 • Seattle 1 • Los Angeles 14
International Division: Milwaukee 1 • *Licensee in Canada: John Inglis Co., Limited*

A. O. SMITH CORP.
Dept. G-1047
Milwaukee 1, Wis.

Tell me the whole story, how I can make more money with "*Permaglas*".

Name_____

Firm_____

Street_____

City_____ State_____

***Manufacturers also of quality zinc-lined *Duraclad* and *Milwaukee* models**

GEO. D. ROPER CORP., Rockford, Ill., began nation-wide promotion of its new "Town and Country" range with the first appearance of a two-color full page advertisement in the Sept. 13 issue of the "Saturday Evening Post." The Roper campaign ties in with the American Gas Association and Gas Appliance Manufacturers Association promotion and advertising program that was scheduled to start in September.

KAISER FLEETWINGS CORP., Oakland, Calif., is cooperating with "Winner Take All," a radio quiz program, in the promotion of Kaiser dishwashers by awarding one standard cabinet and a case of soap each week to a member of its studio audience. The program is heard daily, Monday through Friday, at 3:30 p.m. EDT over most of the stations of the Columbia Broadcasting system.

NEW PRODUCTS

Continental Range

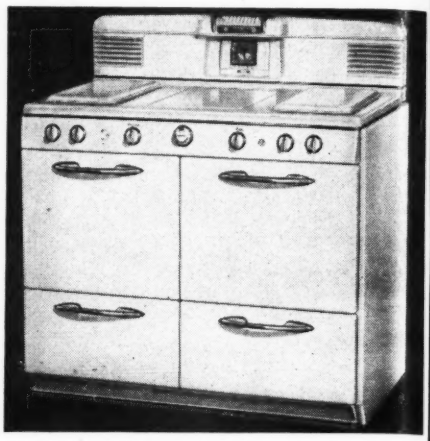
WESTERN STOVE CO., Culver City, Calif.

MODEL: Western-Holly Continental.

APPLICATION: For domestic cooking.

DESCRIPTION: Smooth lines, a new two-tone trim, steel backguard, built-in clock and forward vents are combined in one compact unit. Tempa-plate, a new type of round, flat cooking element, has been designed for cleaner, more efficient cooking. Twin tops with cover top trays, a concealed aluminum griddle, and a visual control panel are featured.

The Continental has twin ovens, including the new Broyl-oven and an oversize baking oven, both in a one-piece front. For greater cleanliness, all inside corners are rounded. Extra features include a Modern-way broiler in addition



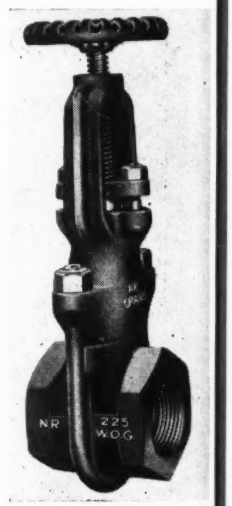
to the Broyle-oven, large utility drawer, hidden drip trays, electrical appliance outlet, and tightly sealed doors achieved by a new engineering device.

Cast Iron Valves

CRANE CO., 836 S. Michigan Ave., Chicago, Ill.

MODEL: Ni-Resist Gate Valves.

APPLICATION: Especially suitable for soda and sulfate pulp mill service, for creosote used in wood preserving, for handling sour ditsillates and crudes in petroleum refinery work and for other services in which the fluids to be handled require a less active metal than cast iron, but in which the cost of special corrosion - resisting valves is prohibitive.



DESCRIPTION: These valves, discontinued prior to the war and recently reinstated, are of the wedge disc, outside screw and yoke type and are furnished with screwed ends in sizes from ½ in. to 2 in. and with flanged ends from 1 in. to 8 in. All valves in 3-in. and smaller sizes have the clamp type bolted bonnet and 4-in. to 8-in. sizes, inclusive, have the conventional type of bolted bonnet. Body and bonnet of all valves, the disc in 4-in. and larger sizes, and the gland in 3-in. and smaller sizes, are made of Ni-Resist. This material has about the same strength and physical characteristics as cast iron, but resistance to erosion and wear is definitely superior to that of cast iron, and corrosion resistance is substantially better. To add to their corrosion resistance, the stem and body seat rings, the disc in 3-in. size and smaller, and the disc facings in 4-in. size and larger are made of Crane 18-8 alloy steel.

PIPE LINE ENGINEERS CONTRACTORS
Williams Brothers Corp.

PIPE LINE
CONTRACTORS

OIL - GAS - GASOLINE - WATER
PIPE LINES AND PUMP STATIONS

Also Heavy Construction

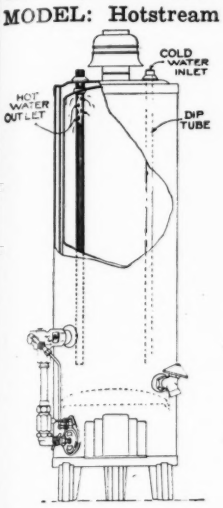
WILLIAMS BROTHERS CORP.

NEW YORK • TULSA • ATLANTA • HOUSTON

Tanksaver

HOTSTREAM HEATER CO., 2363 East 68th St., Cleveland, Ohio.

MODEL: Hotstream Tanksaver.



APPLICATION: The function of the Tanksaver is to protect the tank by diverting the corrosive electrolytic action of the water from the tank to a magnesium rod.

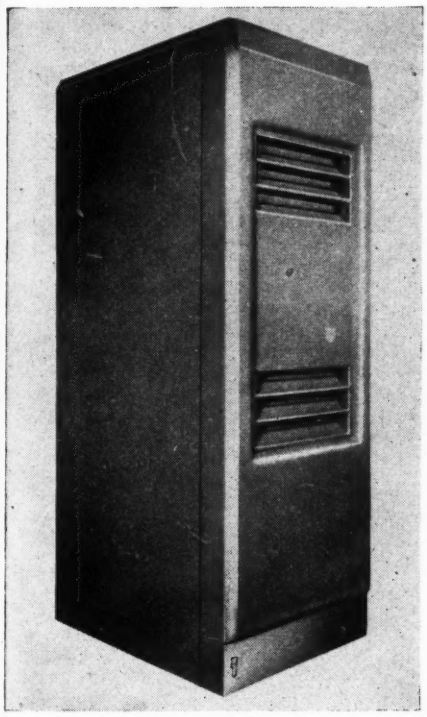
DESCRIPTION: The device consists of a special magnesium alloy rod with fittings which enable installation in a water heater tank at the hot water outlet. An iron core running the full length prevents "necking off" of sections, insuring positive metal-to-metal contact with the tank as long as any magnesium remains.

Air Conditioner

HAMMEL RADIATOR ENGINEERING CO., 3348 Motor Ave., Los Angeles 34, Calif.

MODEL: Comfortaire.

APPLICATION: To be installed in utility rooms, service porches, or building recesses for winter air conditioning.



DESCRIPTION: Norbert Shaeffer, designer, has planned this unit to use the minimum floor space and still maintain low overall height. The result is an attractive, practical cabinet housed unit. Overall height is 60 in., width from 20 to 28 in., and depth is 27 in. It maintains an hourly Btu output of from 60,000 to 120,000 units depending on the model. The Comfortaire includes as standard equipment a switch for summer ventilation, renewable air filters, and a fan and limit switch.

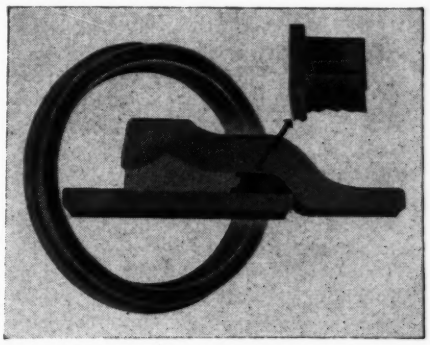
Ring Packing

SMITH-BLAIR, INC., South San Francisco, Calif.

MODEL: Water-Lock Ring.

DESCRIPTION: Self-adjusting, self-locking rubber ring packing for the pouring of wet or dry bell and spigot cast iron pipe joints. Can be used with any joint compound and may be installed quickly without cutting or fitting.

DESCRIPTION: According to the manufacturer, Water-Lock is the only sealing ring hydrostatically designed to increase its sealing action automatically from the pressure in the line. Without compound it will hold 40 to 60 lb. of pressure. Because the ring is non-porous, it cannot be a culture point for bacteria or other contaminating elements.



There Are Three "P's" in PROPANE

Product

Warren's Propane and Butane are the finest, low-cost, high-purity gaseous fuels for industrial and domestic use.

Production

These versatile fuels, manufactured by Warren, are of uniform high quality to give you efficient year-'round service.

Producer

Warren's extensive experience, engineering and technical skills, and modern plants qualify them as one of the leaders in the Liquefied Petroleum Gas Industry.

"1922-Silver Anniversary Year-1947"

WARREN PETROLEUM CORPORATION
TULSA, OKLAHOMA
Detroit Mobile Houston

"Elno"

TRADE MARK REG.

RUST PREVENTER

For Automatic Water Heaters, Range Boilers, And All Types Of Hot Water Storage Tanks

"Elno" prevents rusty water in domestic and industrial water heating systems. It is a pure and simple rust preventer. It extends the life of galvanized storage tanks, especially where corrosive water conditions exist.

"Elno" is made to fit all makes of Automatic Water Heaters, Range Boilers, and Large Volume Hot Water Storage Tanks.

"Elno" is easy to install. Remove the hot water fitting and replace it with the "Elno" rod—that's all. "Elno" is equipped with a hot water fitting.

"Elno" enables you to sell Clean, Rust-free Hot Water Service. "Elno" gives you another talking point, an added selling feature.

There is an "Elno" made to fit the water heater you sell.

Write for prices.

If you want to read the Story of Corrosion, its Causes and Prevention, write for Facts Bulletin No. 102.

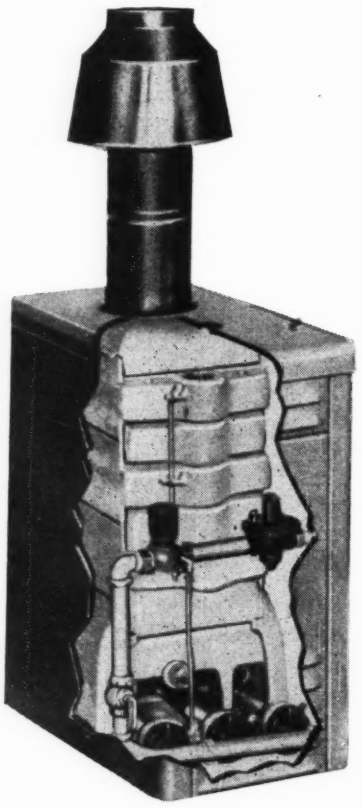
The Cleveland Heater Co.
"Elno" Division
2310 Superior Avenue
Cleveland 14, Ohio

Heating Plant

HOOK & ACKERMAN, INC., New York, N. Y.

MODEL: Hydrotherm.

APPLICATION: For modern convector and panel heating systems. Multiple



family and apartment houses can be economically and efficiently heated by a bank of Hydrotherms or single units in each apartment with individual thermostat control.

DESCRIPTION: Claimed to be the world's smallest heating plant, this unit, according to the manufacturer, has a higher capacity in ratio to size and weight than ever before attained. The Btu output is 57,600 units per hour or 246 Btu per pound. Hydrotherm claims better than 80% thermal efficiency.

The compact, scientifically designed and precision built absorption unit with its zig-zag flow of water through the horizontal sections, prevents undesirable internal circulation within the absorption unit. The water circuit generates a positive pressure which assures rapid and continuous circulation of hot water through the entire heating system, usually without the aid of pumps. The patented heat transfer unit consists of deep ribbed, over-lapped and staggered horizontal sections, allowing more of the heat transfer surface to be surrounded by the radiant flame, and assuring the highest fuel economy. It can be installed by one man.

FOR SALE

ARMY SURPLUS TWIN UNIT GAS HEATERS WITH FANS, 245,000 Btu each, priced to sell. P.O. Box 348, Hartford City, Indiana, Phone 313 or 719.

WANTED

A well-qualified man for supervision of Production and Distribution of artificial gas. No managerial or commercial experience necessary. Should be over forty (40) years of age and should have had ten (10) years' practical experience in production and distribution. Box 200, 1709 W. 8th St., Los Angeles 14, Calif.

Combination Range

ROBERTS & MANDER CORP., Hatboro, Pa.

MODEL: LJ-85D.

APPLICATION: For heating and cooking in domestic kitchens.

DESCRIPTION: Featuring a gas room heater with thermostat control, this latest addition to the "Quality" gas range line is designed to provide kitchen warmth in cold localities. The thermostat maintains the desired temperature automatically, and the unit is protected by a positive automatic safety shut-off valve.

Other items included on the LJ-85D model are the "centra-cook top," burners grouped in the center of the range-top, providing work space on both sides;

condiment set and appliance outlet; automatic uni-top burner lighting with removable top plate and four individual grates; smooth-lined, day-light oven, equipped with non-tilt oven racks and an all-purpose burner.

The dimensions of this range are 36 in. wide by 27 in. deep floor space; 49 in. height overall; 36 in. height to cooking top; 16 in. wide, 20 in. deep, 14 in. high oven size. The approximate shipping weight is 325 lb.

Suspended Heater

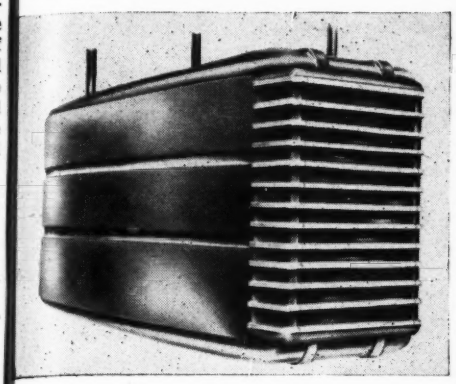
NACO MANUFACTURING CO., Huntington Park, Calif.

MODEL: Pacific Suspended Heater.

APPLICATION: For use in stores, shops, auditoriums or other installations where interior decoration is an important factor. Primarily designed for commercial and industrial use.

DESCRIPTION: Heating element, fan assembly and gas controls are completely enclosed in the streamlined body and no boilers, central heating system

or ducts are required. Expansion of the heating system in future building alterations is simple, as other units can be added where and as needed. An exclusive feature emphasized by the manu-



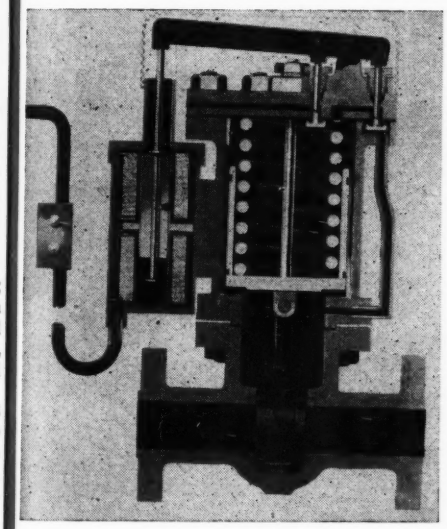
facturer is the Thermo-Flo, a distinctive type of heating element which is claimed to deliver a fully balanced heat pattern. The heater is suspended overhead, directing the spread of warm air downward by fan. Thus, no valuable floor space is wasted.

Valve Control

SHAFER VALVE CO., INC., Mansfield, Ohio.

MODEL: Shafer Valve Control.

APPLICATION: Available for operation of valves from 1 in., and for pressures ranging from 25 to 6000 lbs., this control will operate on either 110 or 220 AC or DC current. Remote control is not limited to the use of electricity. It can be effected by substituting a simply constructed pressure operating unit for the

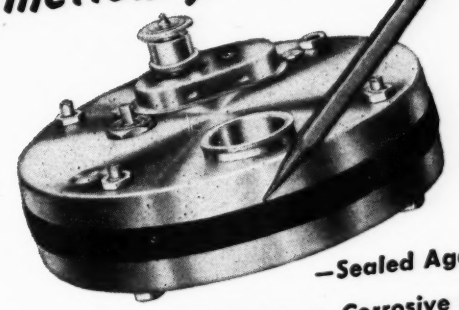


solenoid, plus two small pipes with a single four-way valve at the control center. When the Shafer valve control is applied to gate valves, the valve can be installed with either side to the upstream pressure.

DESCRIPTION: No current is required to maintain the valve in either open or closed position. Contact of one switch for a few seconds energizes the solenoid coil and opens the valve. Only three wires to the Shafer valve control and two control switches at the operating center are required to control the valve. No exhaust is required to maintain the valve in either open or closed position.

ARCCO

Hermetically Sealed



—Sealed Against

Dirt, Moisture, Corrosive Gases

ARCCO MACNICK CHART CLOCK

The clock has been engineered to insure accurate operation under all field conditions. The case, made in two parts, is joined and hermetically sealed as a protection against destructive elements. Pinions are machine cut and splined to their gears. More than ample power is provided by an extra heavy main spring. Light balance wheel is set in jewel bearings.

ONE CLOCK . . . 10 Rotation Speeds

The Arcco Macnick Chart Clock runs eight days with one winding, the chart hub arbor turning once in 24 hours. Interchangeable converter gears effect one turn of the chart in 2, 3, 4, 6, 8, 12 or 24 hours or in 2, 3 or 7 days. Standardize on Arcco Macnick and reduce your clock inventories. Many thousands now in use. Price $10.50 fob Los Angeles or Tulsa.

Send for Bulletin No. 104-A

AMERICAN RECORDING CHART CO.

3113 E. 11th St. • Los Angeles 23, Calif.

Available for Early Delivery

SEND FOR BULLETIN No. 104-A

CONNELLY IRON SPONGE

For Real Gas-purifying Power

To get top efficiency in gas-purification at the lowest cost, use Connelly Iron Sponge. It's the finest purification material to be had.

Connelly Iron Sponge has a high degree of activity. It gives longer service before fouling. It revivifies more quickly. Leading gas companies have been using this "blue-ribbon" purification material for years — they know it can be relied upon to do the best job.

If you have a problem in gas-purification, take advantage of Connelly's 71 years of experience. Our engineers will be glad to help you . . . there is no obligation. Consult Connelly!

CONNELLY, INC.

3154 S. California Ave., Chicago 8, Illinois

Elizabeth, N. J. Los Angeles, Calif.

TAPECOAT Those "Weak Links"

In Your Fight Against Corrosion...

It doesn't make sense to protect pipe with quality coatings and then use makeshift protection on pipe joints. After all, protection is only as good as its weakest joint.

That's why more and more distribution engineers are standardizing on TAPECOAT—the dependable wrapping in tape form that provides pipe joint protection equivalent to the mill coating on the pipe.

TAPECOAT is easy to apply. You simply spiral wrap the joint, starting and ending on the mill coated pipe, thus making the protection on the joint equal to the coating on the pipe. It will pay you to guard against those "weak links" with TAPECOAT.

Write for complete details.

The TAPECOAT Company

1523 LYONS STREET EVANSTON, ILLINOIS

The valve is opened by line pressure—closed by a compressed spring. Valves can be supplied to operate at a predetermined speed.

Several types of automatic shutoff are possible with the Shafer valve control: (1) Safety shutoff or unloading in case of power failure can be provided with the addition of a special safety control unit, (2) As a protection against line failure or blowout, the pressure control unit can be connected with the line so that a predetermined drop in pressure will actuate the control and the compression spring will close the valve, (3) The manual operated unit can be directly connected with a float level control to automatically regulate the volume of liquid in a tank.

Pressure Relief Valve

KEROTEST MANUFACTURING CO., 2525 Liberty Ave., Pittsburgh 22, Pa.

MODEL: LP-Gas Pressure Relief Valve.

APPLICATION: Patented full-lift design provides a maximum discharge capacity for a given pipe size and pressure setting.

DESCRIPTION: The valve, which is listed with Underwriter's Laboratories, Inc., has seating material of a special substance not affected by the solvent

action of LP-Gases and treated to avoid influencing the pressure setting of the valve. Valve springs are plated, heat treated spring steel and are designed to retain permanently their initial settings.

Magic Chef Range

AMERICAN STOVE CO., 4301 Perkins Ave., Cleveland 3.

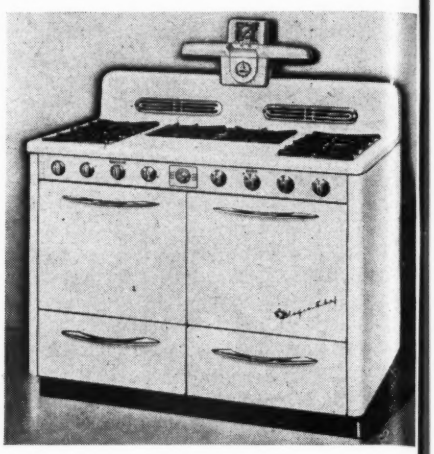
MODEL: Magic Chef range.

APPLICATION: For use in domestic kitchens.

DESCRIPTION: Automatic clock control, a six-burner top-of-stove arrangement, and a larger capacity throughout are the main features of the new Magic Chef gas range now being shown in appliance showrooms throughout the country. This model has a one-piece turret top, thus eliminating cracks and simplifying cleaning. The range top measures 43 in. x 23½ in., allowing for the two extra burners and plenty of working space. The new Magic Chef is built flush to back, wall, sides, and floor.

The automatic clock control of the unit lights all burners, top, oven, and broiler. A waist-high, swing-out broiler on this model has a 26% greater broiling area. The broiler grid has slots which permit fats and meat juices to drip into the broiler pan out of the heat zone where they can't smoke or catch fire. With six adjustable rack positions, it can be used as an auxiliary oven for roasts and whole chickens.

New dimensions of the oven are 18 in.



width, 20 in. depth, and 14 in. height. Other features of the Magic Chef's latest model include thick Fiberglass insulation, a lifetime burner guarantee, a sanitary burner tray which catches spillovers, and a large utensil drawer for storage of cooking equipment.

CATALOGS

UNIVERSAL CONTROLS CORP., Garland, Texas—"Universal Gas Regulators for House Service and Engines Using Gas Fuel" is the title of an eight-page catalog, No. 101. These regulators, intended for use in reducing the pressure of cold gaseous fluids, are designed for industrial systems. The catalog describes regulator construction, relief valve construction, capacities for various inlet pressures and orifice sizes, service conditions, ordering information, list prices, and list of replacement parts.

THE GAS MACHINERY CO., 16120 Waterloo Road, Cleveland 10, Ohio — Bulletin A-200 describes the company's patented twin generator oil gas process for production of high Btu oil gas. The process is claimed to offer these advantages: more thermal output per dollar of plant investment, 24-hour operation without shut-downs for charging or clinkering, reduced manpower requirements and cleaner operation.

KEROTEST MANUFACTURING CO., 2525 Liberty Ave., Pittsburgh 22, Pa.—Bulletin 47-LP contains details concerning a recently developed LP-Gas pressure relief valve with patented full-lift design to provide a maximum discharge capacity for a given pipe size and pressure setting. Other Kerotest LP-Gas valves and tank fittings also are described in the four-page catalog.

THE FOXBORO CO., FOXBORO, MASS.—Catalog 370-1, "Industrial Instrumentation," describes indicating, recording and controlling instruments for temperature, pressure, flow, liquid level, humidity and other process variables. An index table lists the more common Foxboro products. The firm's general service, repair service and guarantee are discussed.

ASKANIA REGULATOR CO., 240 E. Ontario St., Chicago 11, Ill.—Bulletin No. 135, "Askania Control for Gas Production," describes various systems for controlling stack draft, furnace pressure and collector mains in gas producing plants. Booster and exhauster controls, either for single or parallel operation, are explained in detail. Gas mixing systems — including propane-butane — both by straight volumetric methods and with Btu correction are illustrated and discussed. Types of holder controls, electronic and hydraulic, are shown, and typical systems are illustrated.

AMERICAN STANDARDS ASSOCIATION, 70 East 45th St., New York 17, N. Y.—A new listing of ASA's 874 standards is available free of charge. A number of additional revised standards approved since the January, 1947, issue are included. Under the new prices, a complete set of all American standards comes to $200 and a complete set of all safety standards costs $32.50. Quantity discounts ranging from 20% to 45% are allowed.

VICTOR EQUIPMENT CO., 844 Folsom St., San Francisco 7, Calif.—"A Presentation of Welding & Cutting Equipment by Victor" is the title of a 20-page, full-color catalog recently issued. The firm's welding and cutting units, welding torches, general hand cutting units, hand cutting torches with head and tube assemblies, machine cutting torches, safety regulators, and cutting tips are featured.

FLORAL CITY HEATER CO., Monroe, Mich.—A six-page bulletin describes, illustrates and lists complete specifications for the Gas-Mizer, automatic gas fired winter air conditioning unit. Heart of the heating plant is the Barber jet gas burner, which the firm has produced for over 20 years. The Gas-Mizer is AGA approved.

CURRENT READING

Extinction of Isobutane Flames by Carbon Dioxide and Nitrogen—G. W. Jones and G. S. Scott. A Bureau of Mines report of investigations.

An important phase of the accident-prevention program of the Bureau of Mines is the determination of the explosion hazards of various combustible gases, vapors, and liquids encountered in mining and allied industries and the development of methods of eliminating or mitigating them. Because of the anticipated commercial importance of isobutane in industry, it has been deemed necessary to study and determine its general explosion hazards. This report gives its limits of inflammability, minimum ignition temperatures, and the amounts of nitrogen and carbon dioxide required to render isobutane-air mixtures noninflammable.

The limits of inflammability of isobutane in air are as follows:

Lower limits of inflammability=1.83% by volume.

Upper limit of inflammability=8.43% by volume.

Isobutane has a minimum ignition temperature of 462°C. in air and 319°C. in oxygen.

The report describes the apparatus used, methods of conducting the tests, and results obtained relative to the use of nitrogen and carbon-dioxide in the

"See Peerless Representatives AGA Convention—Statler Hotel"

First IN Quality

Peerless

★ Circulators
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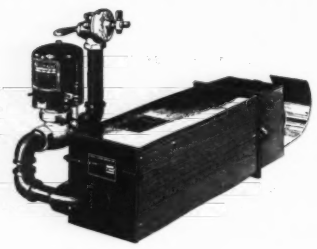
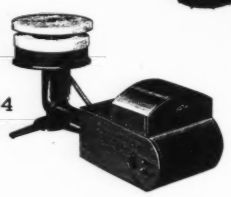


SERIES 400

SERIES 302-20

SERIES 84



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prevention of isobutane-air explosions. The results are presented graphically so that the user may easily determine the explosion hazards of mixtures without resorting to laborious calculations, it being necessary only to know the actual composition of the mixture as determined by gas analysis methods.

Increasing and Maintaining Injection Rates of Water-Input Wells—Compiled by Parke A. Dickey, John F. Buckwalter, Kurt Andresen, E. T. Heck, George W. Holbrook, Wilbur H. Young, Jr., Robert B. Bossler, and Sam S. Taylor. This paper is a report on some of the results of a study which is being conducted by the API Eastern District Topical Committee on Production Technology. It is divided into four parts, viz.: "Advantages of Increased Injection Rates at Water-Input Wells," "Effect of Properties of Flood Water on Rate of Input and Oil Production," "Input-Well Equipment," and "Chemical and Mechanical Treatment of Water-Input Wells." These papers were presented during the 26th Annual Meeting of the American Petroleum Institute, Nov. 14, 1946.

Water flooding for the purpose of producing oil has been practiced successfully in the Bradford and Allegheny fields of Pennsylvania for many years. Numerous properties have reached their economic limit, and many more are approaching it. Often it is observed that, during late stages of a flooding operation, not only oil production decreases to a low value, but water-injection and water-production rates do likewise. Such behavior of a water-flood operation contradicts all theoretical predictions. It has been recognized that maintaining and increasing water-input rates can be of great benefit.

State and Regional Market Indicators 1939-1945—Superintendent of Documents, Government Printing Office, Washington 25, D. C. Released by the Department of Commerce, this booklet is designed to serve as a handy reference for the marketing executives, the manufacturer, and the distributor. It provides a series of measures of the geographic shifts in economic activity during the complete war period, with yearly comparisons carried through from the base prewar year, 1939. The report, a revision and enlargement of a similar one published in 1944, now out of print, which covered the period 1939-43, is foreworded by H. B. McCoy, Director of the Office of Domestic Commerce. The present study, like the previous one, is limited to state and regional data. The 50 tables included appear under the general topics of population, production, construction, employment, income, savings, retail sales, farming and miscellaneous indicators. Data for 1945 are included wherever possible.

Texas Oil and Gas, 1947—Texas Mid-Continent Oil and Gas Association, 907 Continental Bldg., Dallas 1, Texas. This 48-page, illustrated annual report is a source book of official figures on petroleum activity in Texas. It emphasizes the scope of oil and gas production, refining, and marketing and its effect on the economy of the state. One out of every eight Texans gets his living out of the petroleum industry which provides 23% of the state's income, according to a survey conducted by the association.

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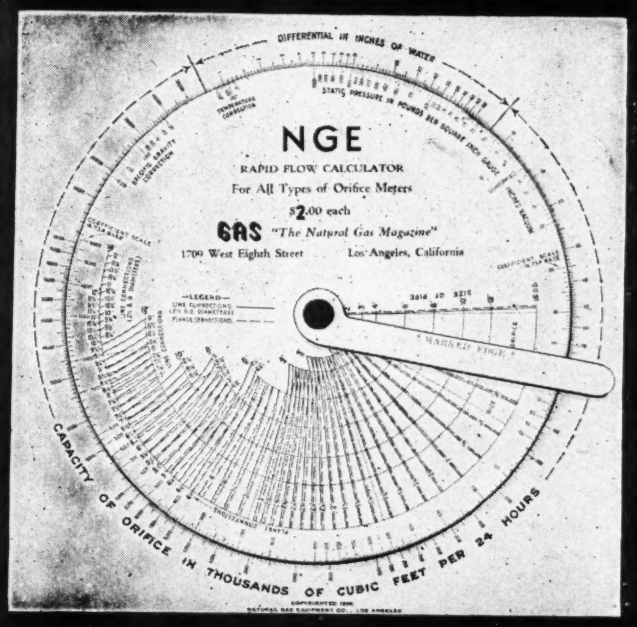
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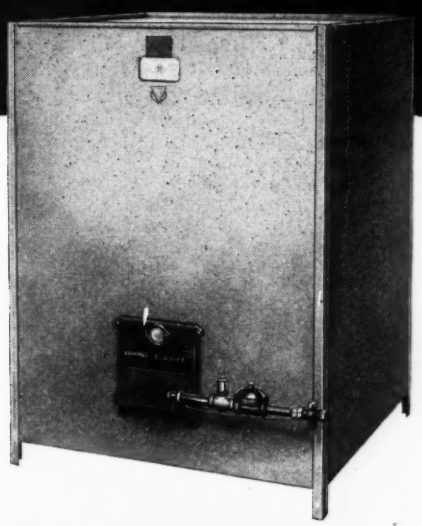

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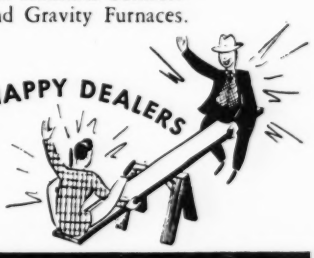

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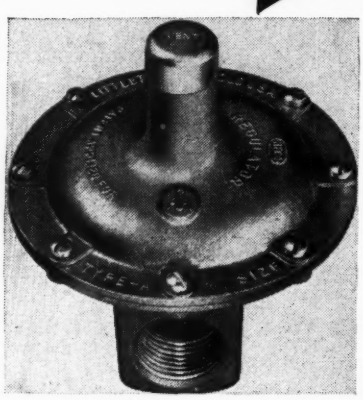

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Extinction of Isobutane Flames by Carbon Dioxide and Nitrogen—Bureau of Mines, Department of Interior, Washington 25, D. C. Prepared by G. W. Jones and G. S. Scott, bureau chemists with the Gaseous Explosions Section, Explosives Division, Central Experiment Station, Pittsburgh, Pa., Report of Investigations 4095 describes the successful elimination of explosion hazards of mixtures of air and isobutane through introduction of certain inert gases. A table showing the amount of inert gas needed to render other combustible-air mixtures also is included in the publication. In most cases, this may be accomplished by adding at least 35% of carbon dioxide or 47.5% of nitrogen to the combustible gas-air mixture, the report states. Physical and chemical properties of isobutane, limits of inflammability in air, minimum ignition temperatures, and the prevention of isobutane-air explosions by oxygen control are other topics covered in the publication. Several charts and detailed technical data accompany the material.

Research in Effect of Ambient Pressures in Combustion Chambers of Contemporary Appliances on Primary Air Injection, Flame and Other Gas Burner Operating Characteristics—American Gas Association Testing Laboratories, 1032 East 62nd St., Cleveland 14. Ambient pressures at the level of burner ports in combustion chambers were determined for ten contemporary appliances including three water heaters, three furnaces, two range ovens, one range broiler, and one unit heater. The pressures measured varied from +0.0012 in. for the broiler to —0.008 in. water column for a furnace. Previous work has indicated that pressures of this magnitude apparently have no appreciable effect on primary air injection, flame, and other gas burner operating characteristics. Also known as Research Report No. 1080 on Project DGR-2-B, it is available at the AGA headquarters, 420 Lexington Ave., New York 17, as well. Price, 50 cents.

Air Conditioning—Herbert Herkimer, M. E. and Harold Herkimer, M. E. Published by Chemical Publishing Co., Inc., Dept. FM, 26 Court St., Brooklyn 2, N. Y. Over 200 industries are offered in this 720-page book as a partial list of those in which the advantages of air conditioning have been recognized and used. The object of the book is to provide all required information on every phase of air conditioning—estimation, sales, production, installation, supervision, service, etc. The laws of chemistry and physics associated with air conditioning are reviewed, and problems and their solutions (with tables and illustrations) are included.

Whatever Became of Slow Joe Blow?—MacAllister Publications, 420 Lexington Ave., New York 17, N.Y. In an effort to find a solution to the need for a booklet or manual on infractions of shop rules which employees would find interesting enough to read, "Saturday Evening Post" writer and artist Charles K. Ellsworth and ex-Navy Commander J. R. MacAllister have prepared this useful booklet. Its 16 pages combine cartoons and text to tell the story of Slow Joe Blow, the first in a series of stories designed to get across industrial relations ideas. A free copy will be mailed on request to MacAllister Publications.